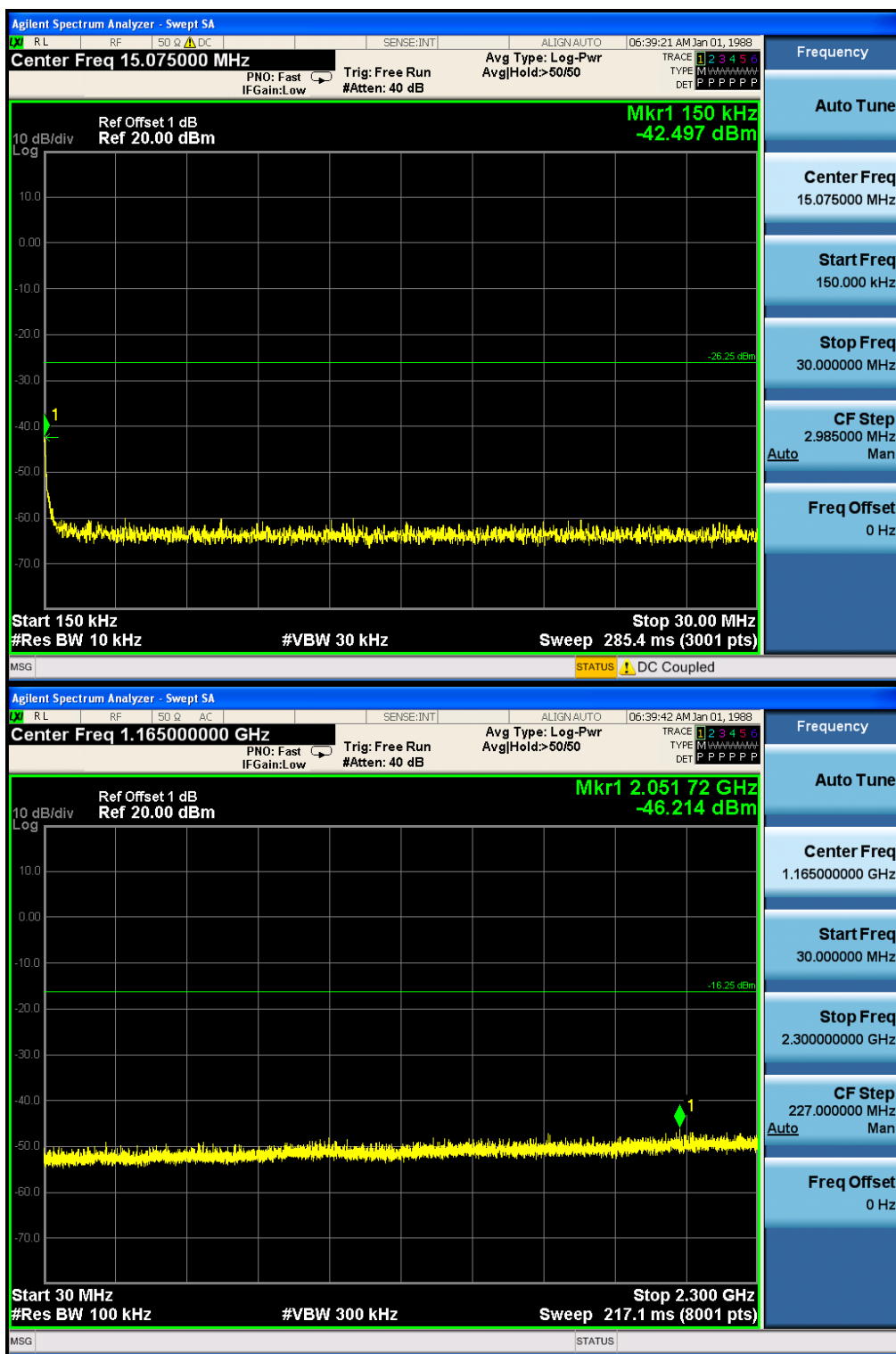




4.8.1.1.6 802.11G_Highest Channel

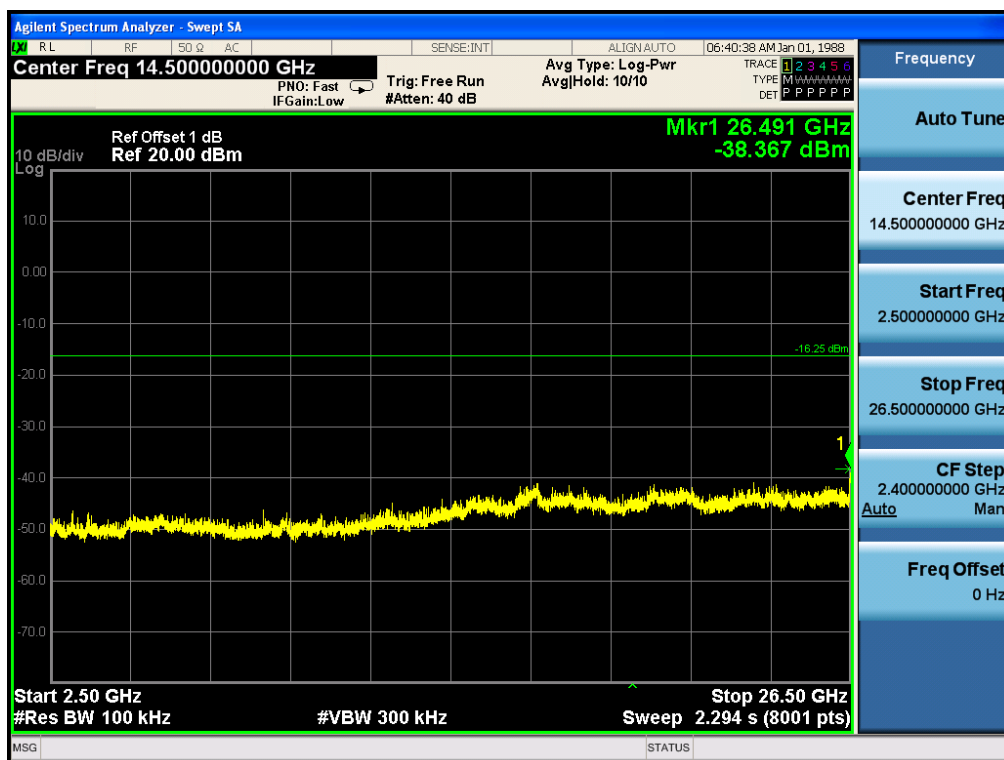






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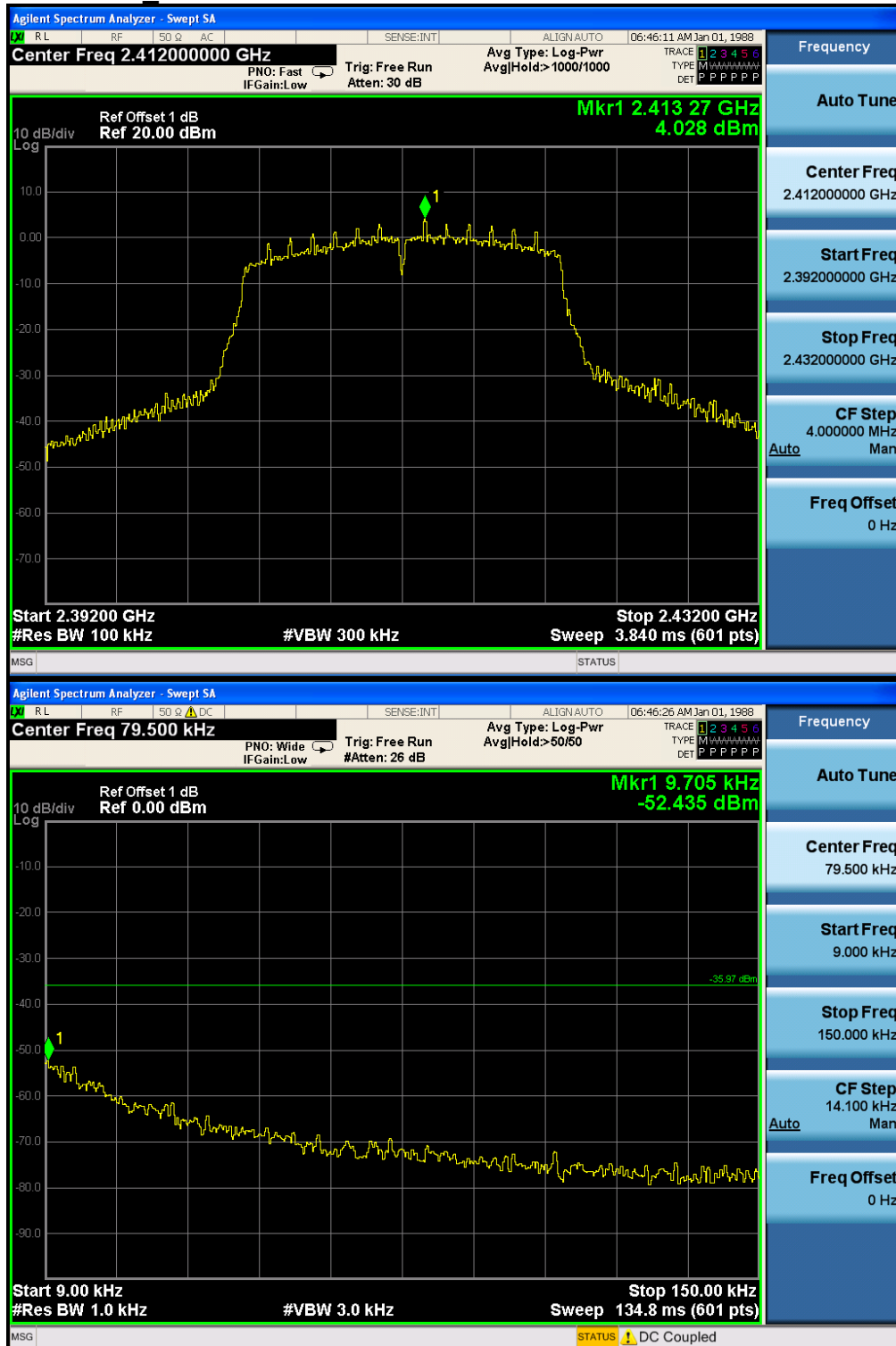
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4.8.1.1.7 802.11N20 Lowest Channel

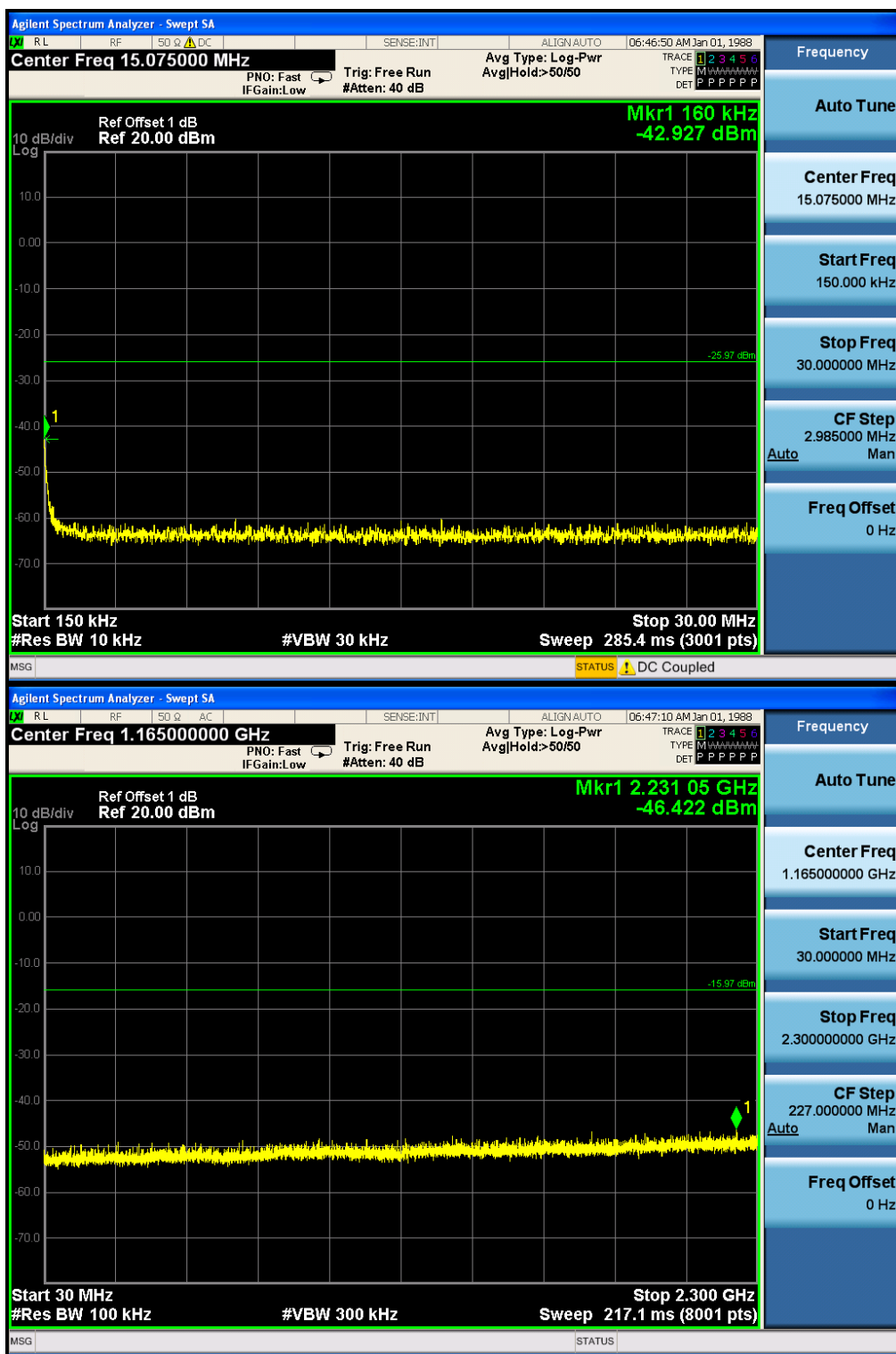


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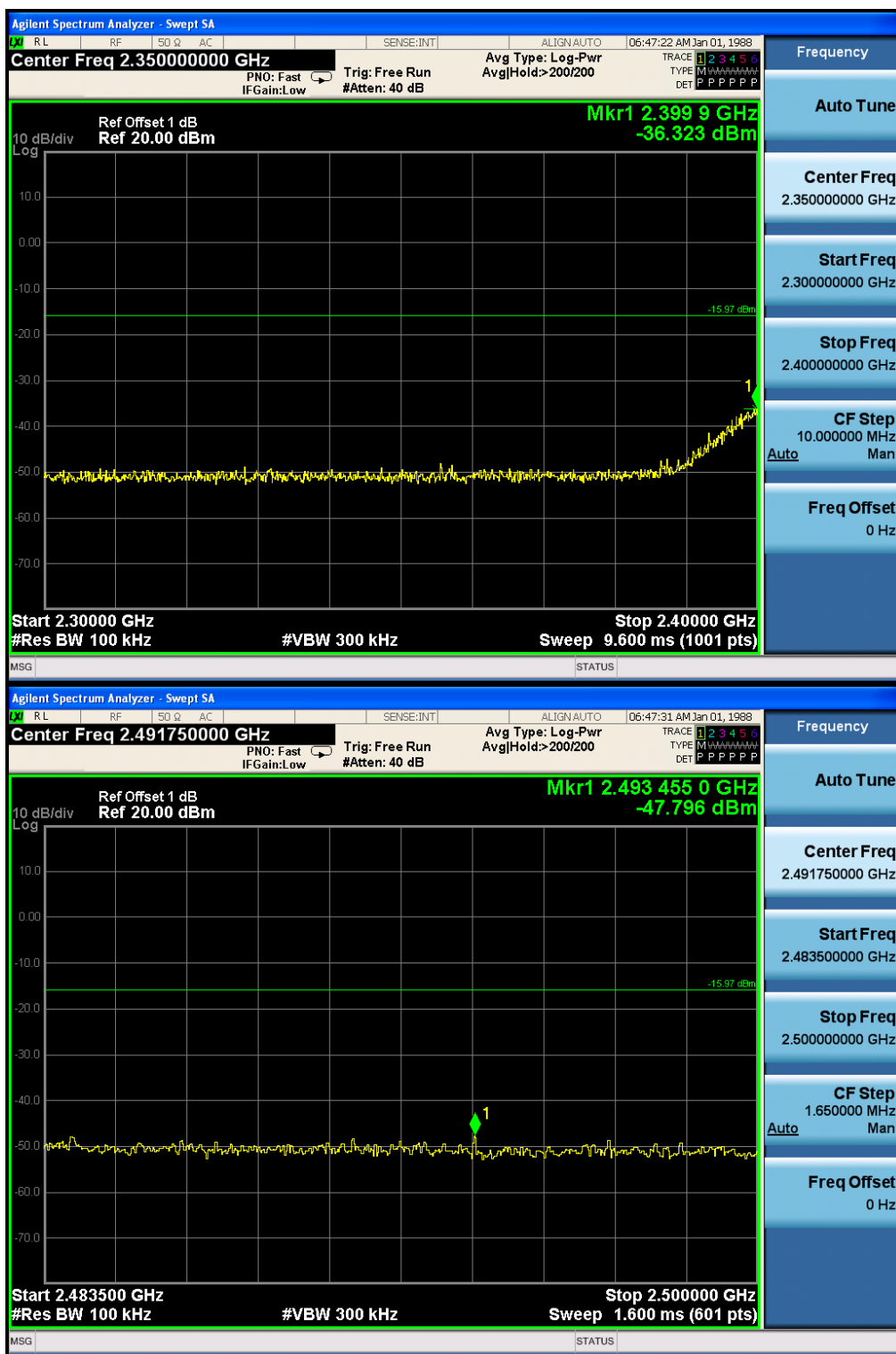
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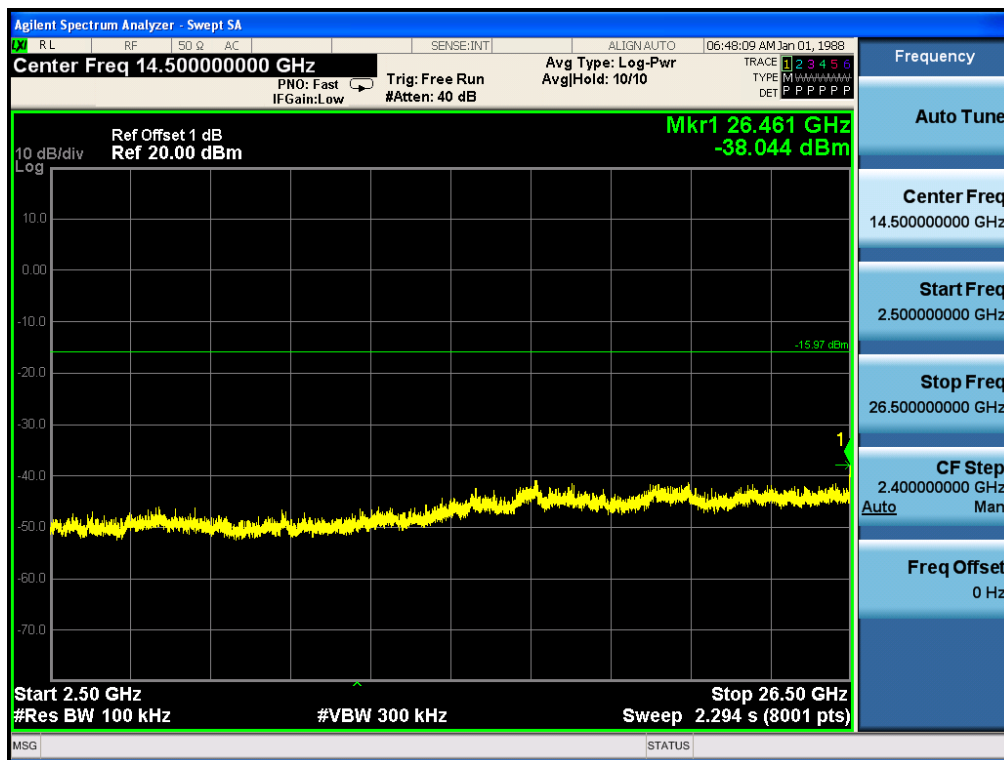


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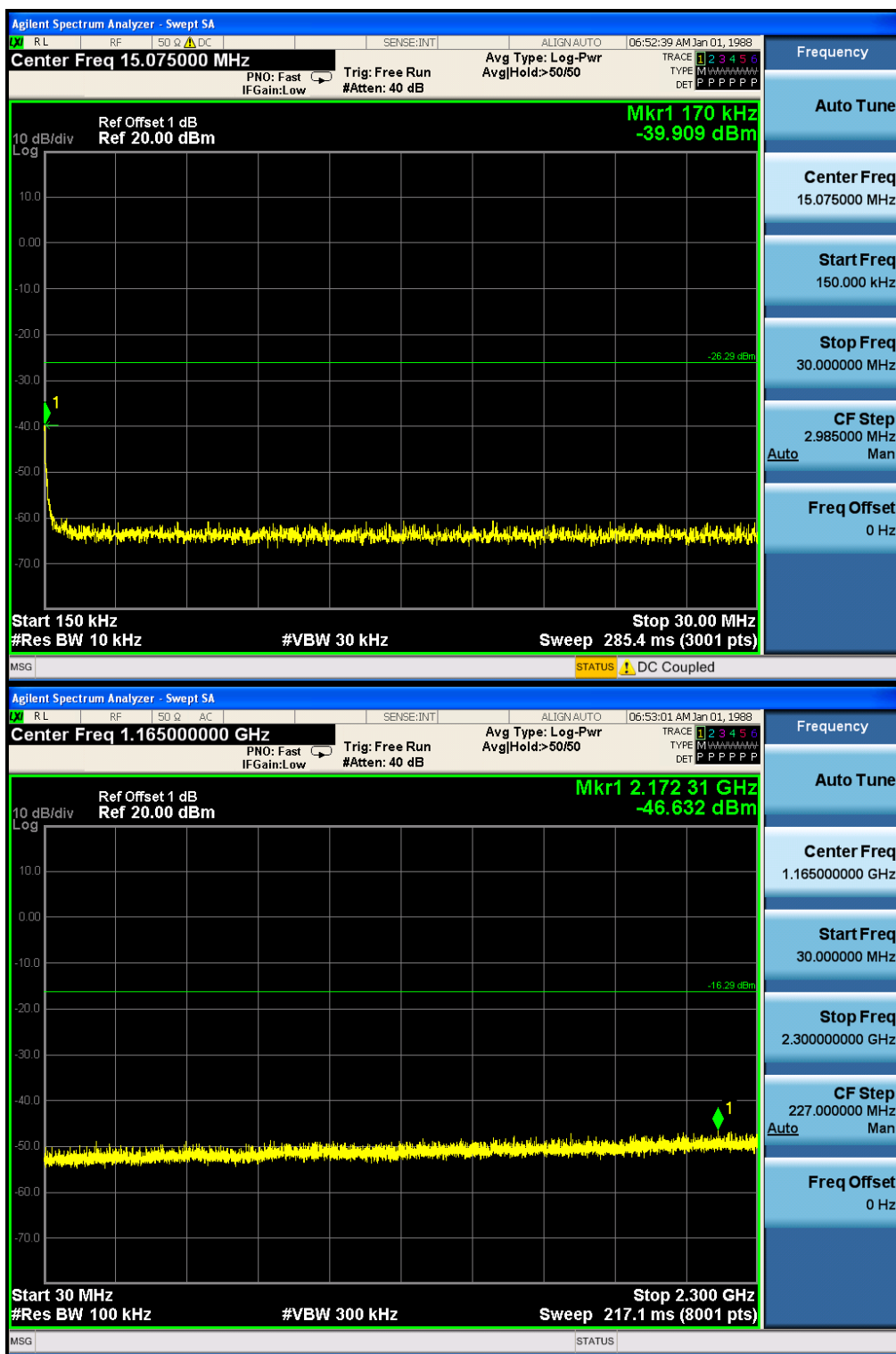
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4.8.1.1.8 802.11 N20_Middle Channel



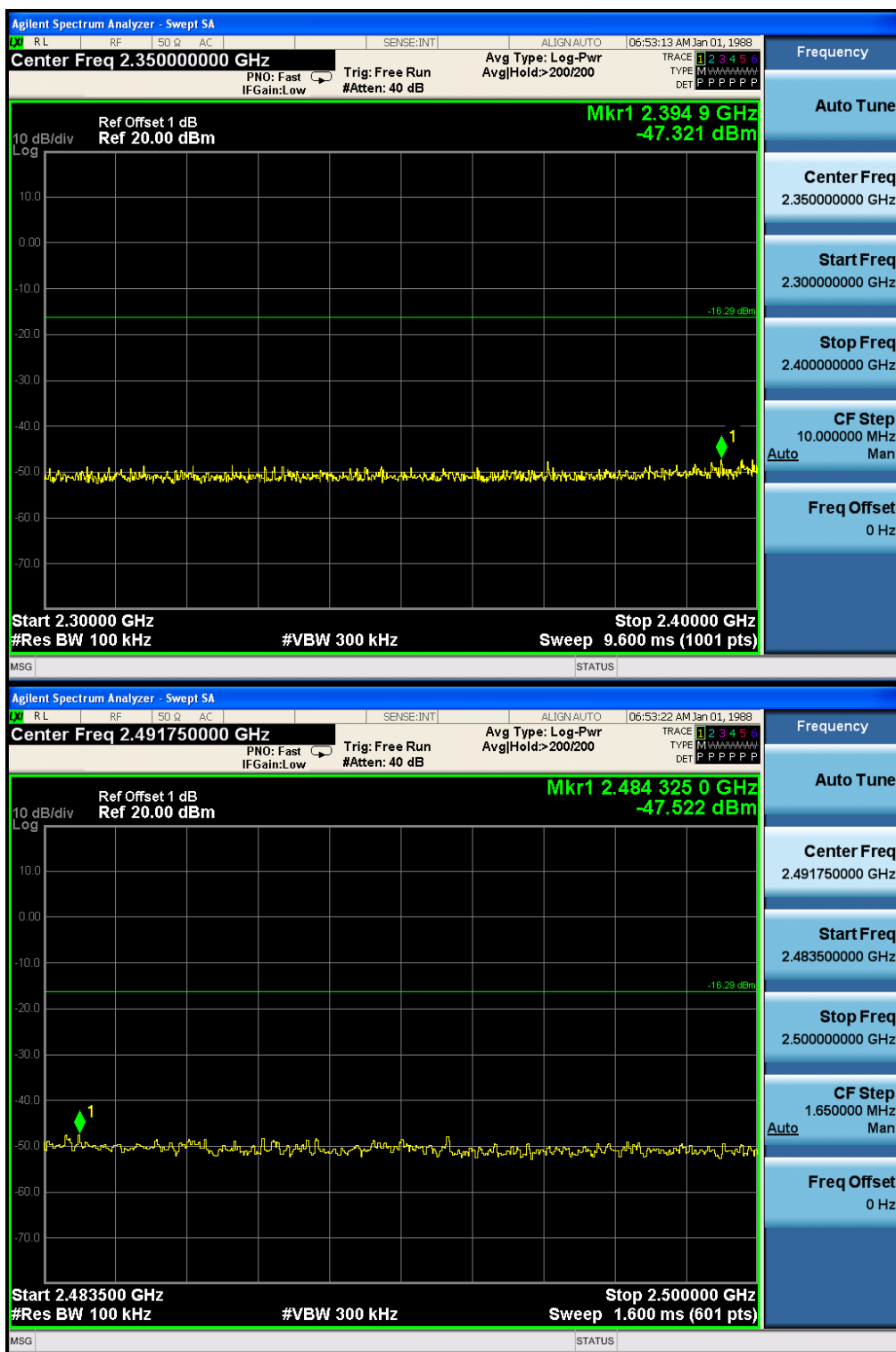


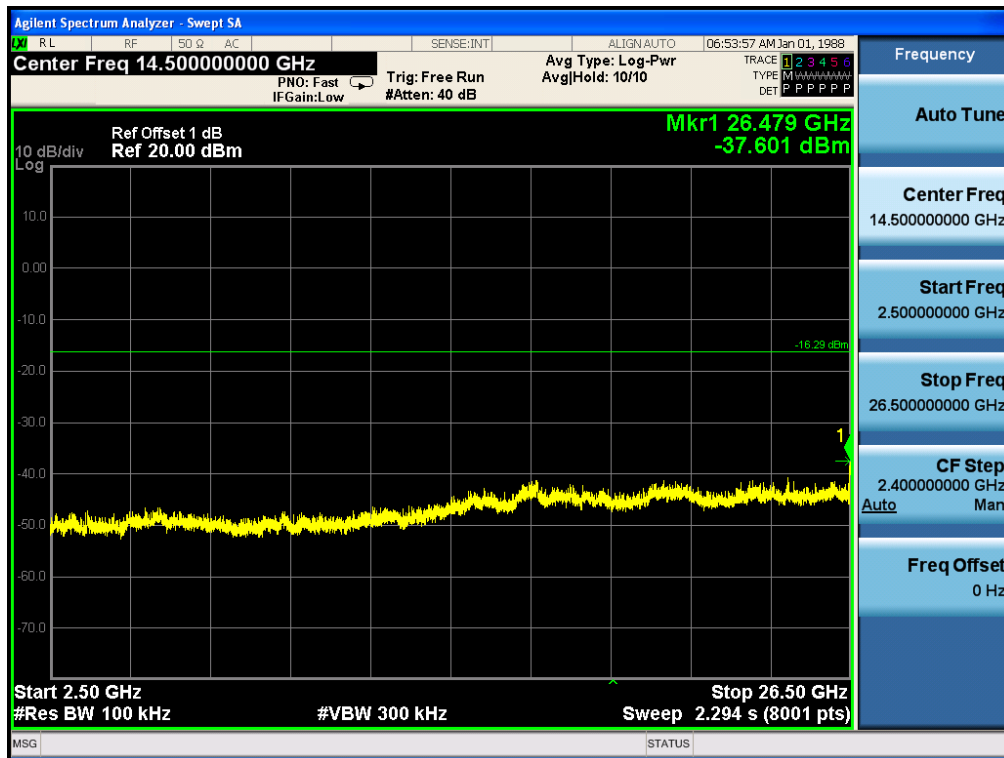
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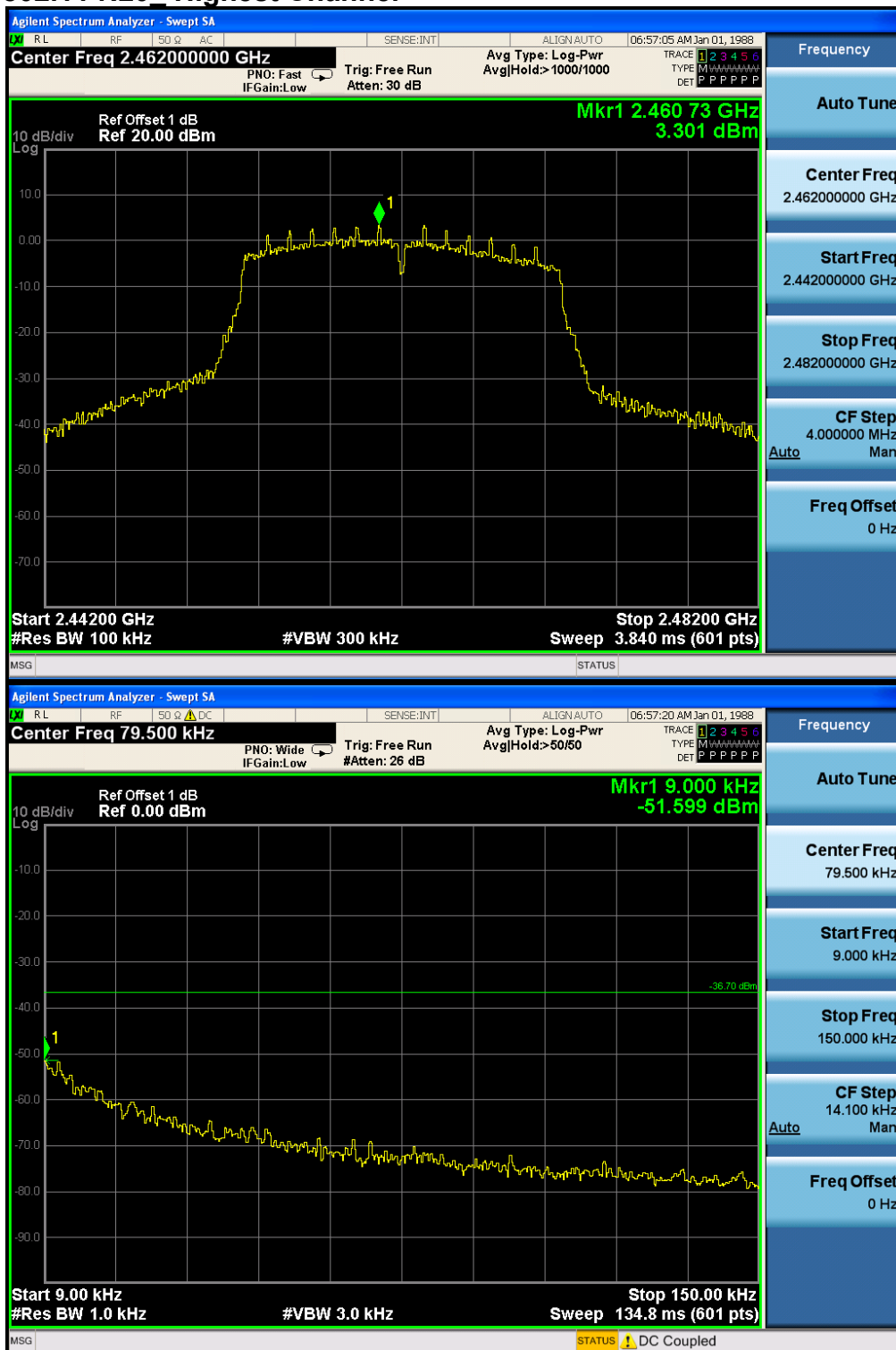
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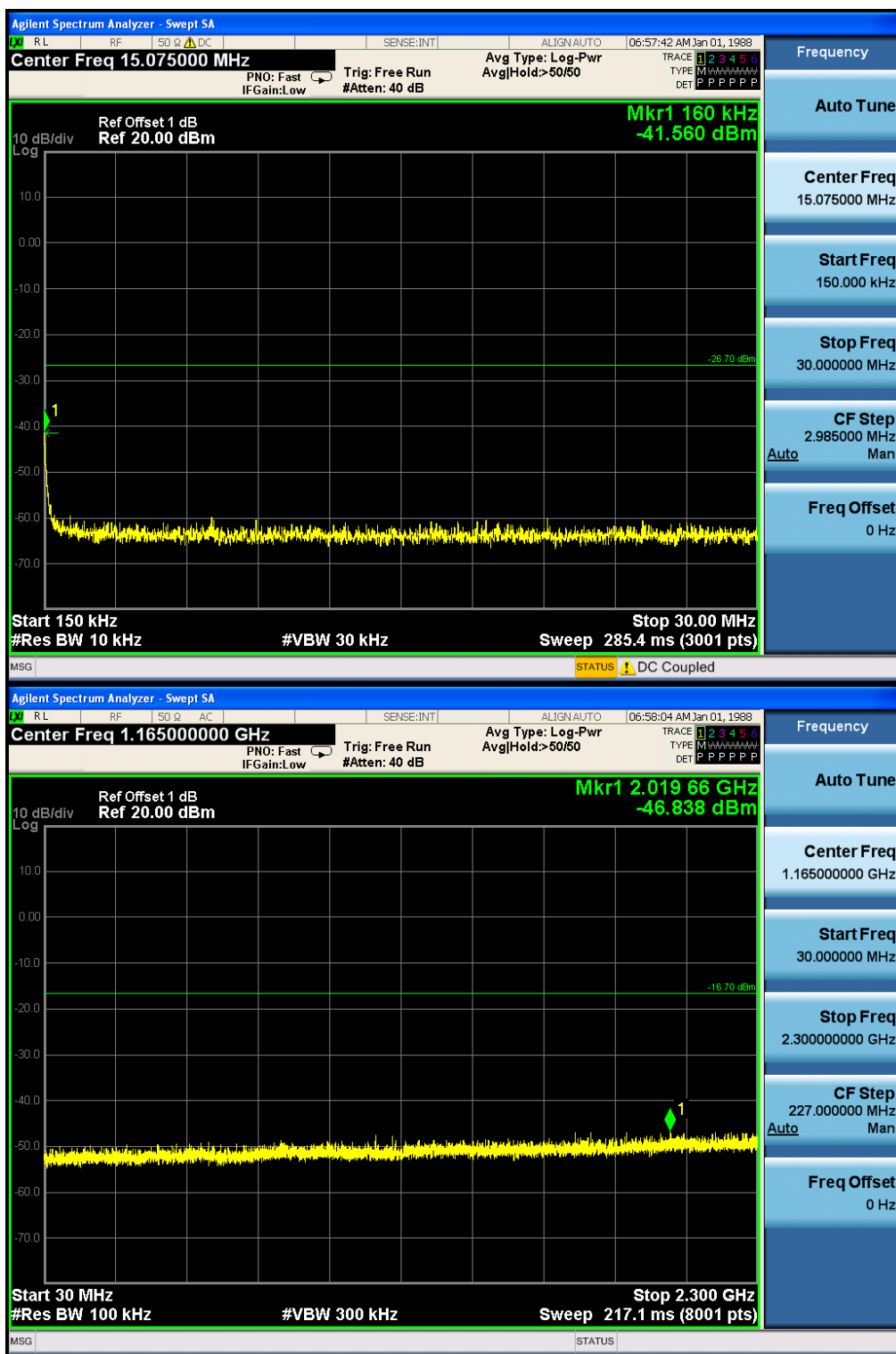
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4.8.1.1.9 802.11 N20_Highest Channel





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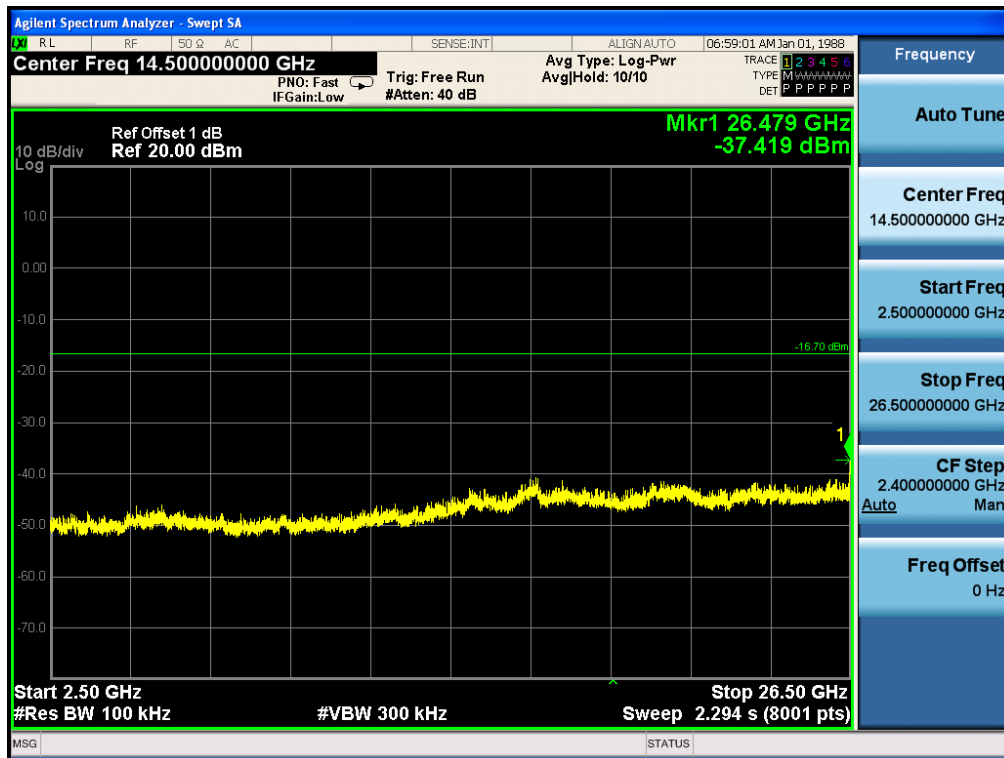


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Remark:

Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.



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4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10 :2013 Section 11.12				
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
	Remark: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.				

Test Setup:	
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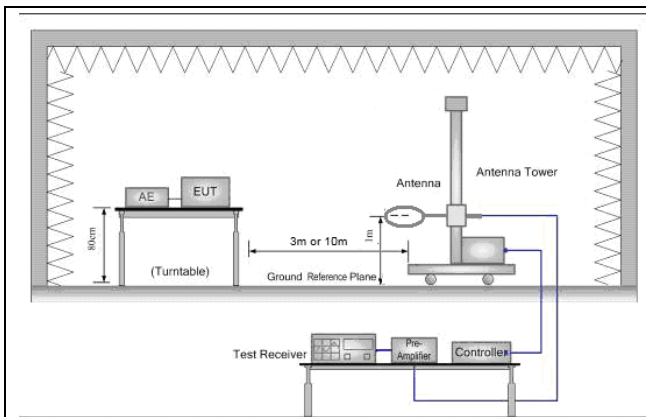


Figure 1. Below 30MHz

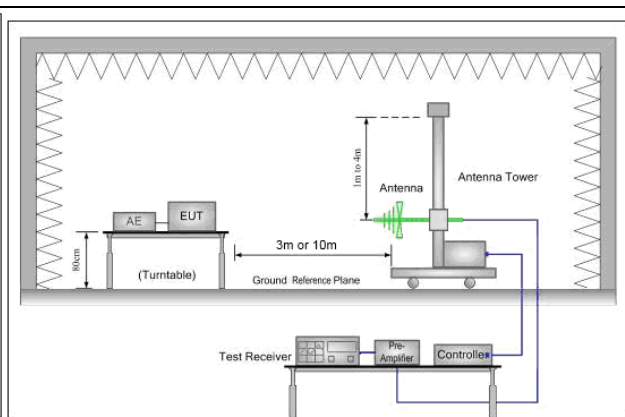


Figure 2. 30MHz to 1GHz

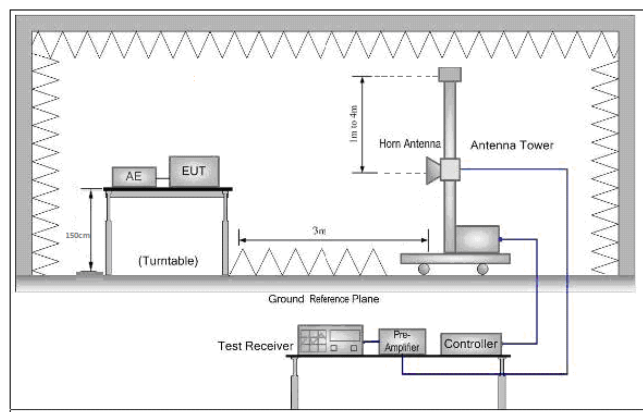


Figure 3. Above 1 GHz

Test Procedure:

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified



	and then reported in a data sheet. h. Test the EUT in the lowest channel, the middle channel ,the Highest channel i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case. j. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.
Final Test Mode:	Pretest the EUT at Charge + Transmitting mode. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G; 6.5Mbps of rate is the worst case of 802.11N(HT20); For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



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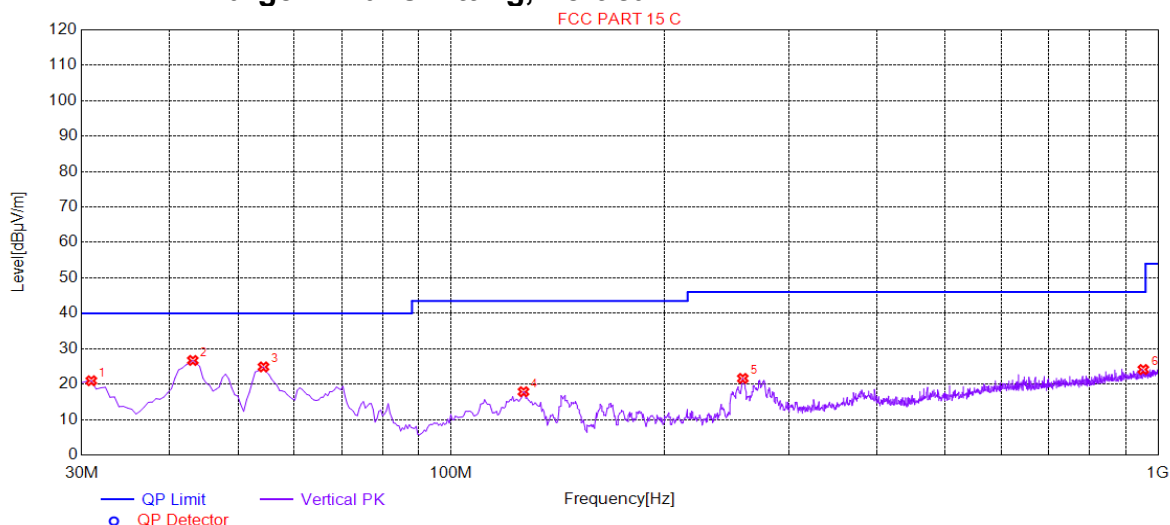
SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch (M-10) Testing Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com



4.9.1 Radiated emission below 1GHz

4.9.1.1 Charge + Transmitting, Vertical

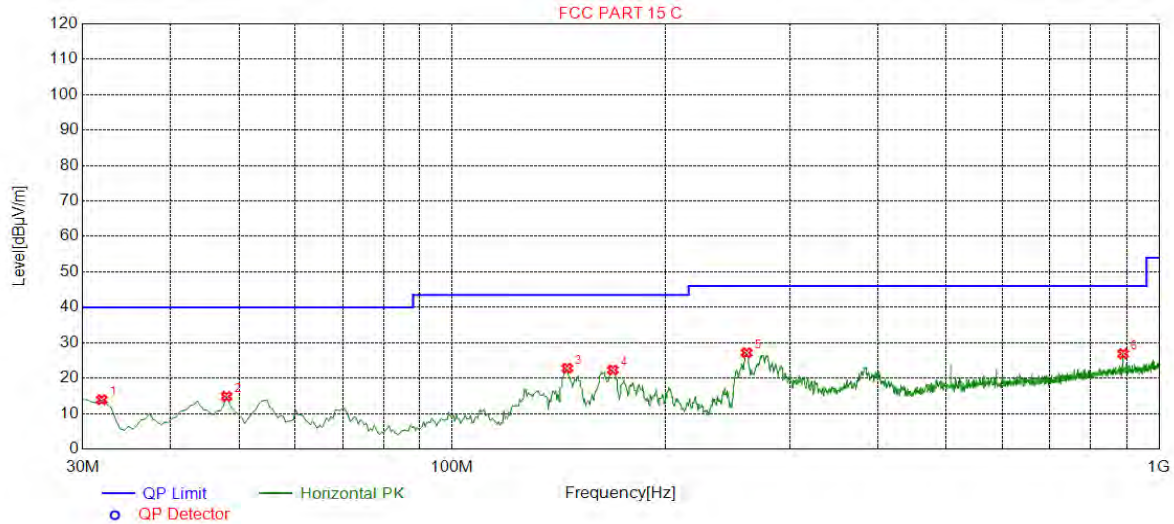


Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.9705	20.96	-32.82	40.00	19.04	100	66	Vertical
2	43.1016	26.69	-30.57	40.00	13.31	100	344	Vertical
3	54.2621	24.87	-30.82	40.00	15.13	100	16	Vertical
4	126.5633	17.87	-34.26	43.50	25.63	100	0	Vertical
5	258.5493	21.62	-28.99	46.00	24.38	200	122	Vertical
6	952.9315	24.14	-14.43	46.00	21.86	200	260	Vertical



4.9.1.2 Charge + Transmitting, Horizontal



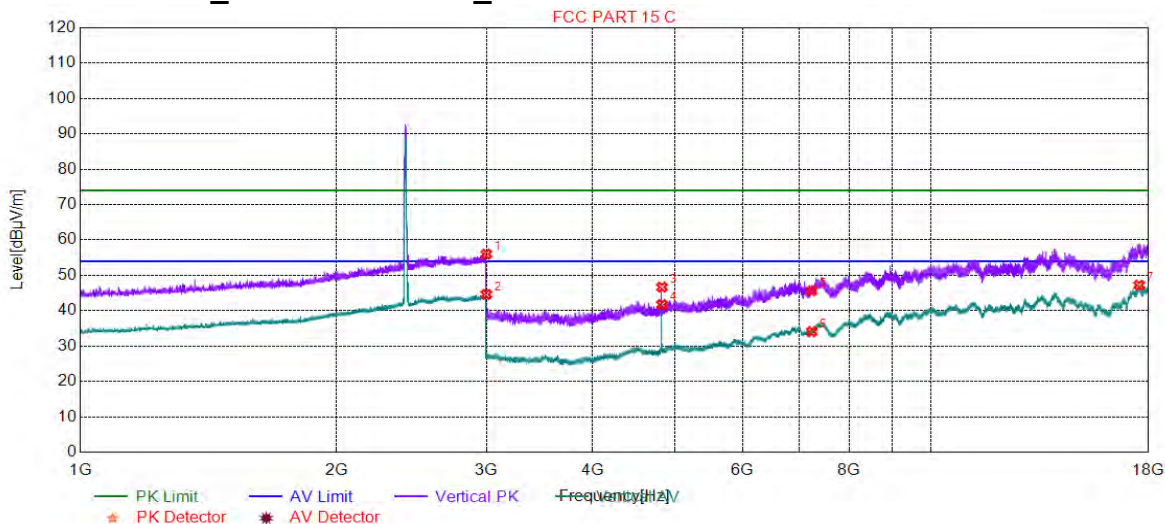
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.9410	13.90	-32.81	40.00	26.10	200	326	Horizontal
2	47.9540	14.85	-30.19	40.00	25.15	200	226	Horizontal
3	145.4877	22.80	-34.97	43.50	20.70	200	273	Horizontal
4	168.7794	22.33	-33.69	43.50	21.17	200	260	Horizontal
5	260.9755	27.15	-28.92	46.00	18.85	100	338	Horizontal
6	889.3647	26.88	-15.40	46.00	19.12	100	1	Horizontal

4.9.2 Transmitter emission above 1GHz

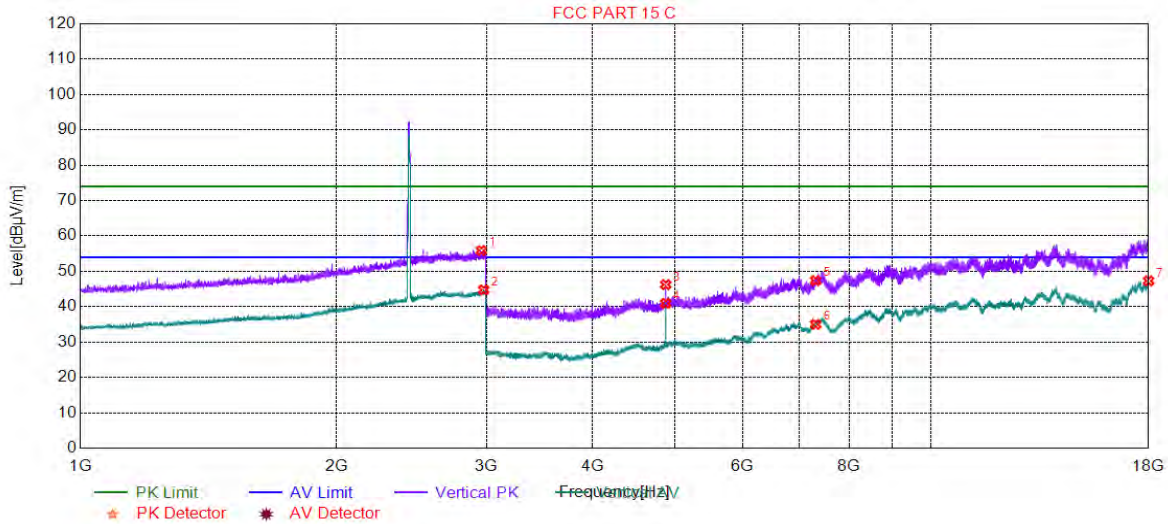
4.9.2.1 ANT1

4.9.2.1.1 802.11B_Lowest Channel_ Vertical



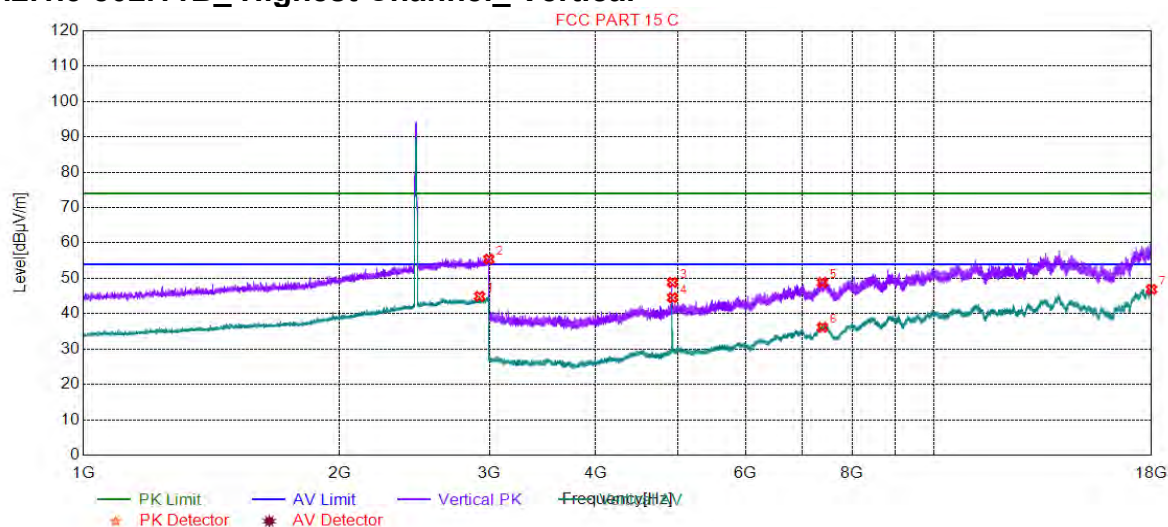
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2999.499	56.00	9.44	74.00	18.00	150	298	Vertical
2	2999.499	44.59	9.44	54.00	9.41	150	42	Vertical
3	4824.000	46.67	-20.09	74.00	27.33	150	116	Vertical
4	4824.000	41.72	-20.09	54.00	12.28	150	116	Vertical
5	7236.000	45.63	-12.40	74.00	28.37	150	34	Vertical
6	7236.000	34.07	-12.40	54.00	19.93	150	8	Vertical
7	17541.47	47.22	0.88	54.00	6.78	150	226	Vertical

4.9.2.1.2 802.11B_ Middle Channel_ Vertical



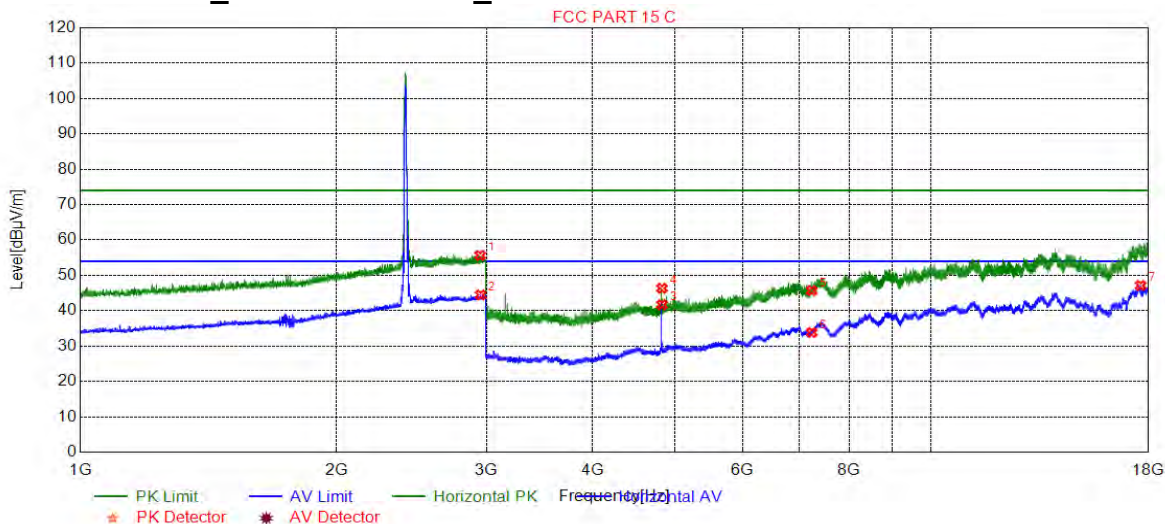
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2958.989	55.92	9.39	74.00	18.08	150	257	Vertical
2	2978.494	44.74	9.41	54.00	9.26	150	185	Vertical
3	4874.000	46.24	-19.37	74.00	27.76	150	126	Vertical
4	4874.000	40.95	-19.37	54.00	13.05	150	99	Vertical
5	7311.000	47.36	-11.50	74.00	26.64	150	342	Vertical
6	7311.000	35.01	-11.50	54.00	18.99	150	234	Vertical
7	17999.00	47.32	-0.36	54.00	6.68	150	317	Vertical

4.9.2.1.3 802.11B_ Highest Channel_ Vertical



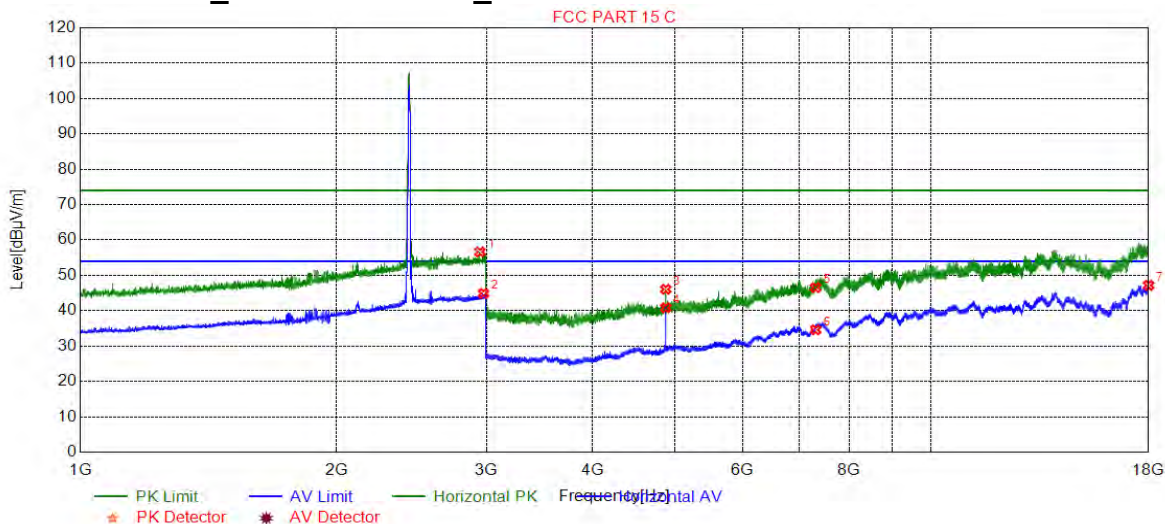
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2921.980	44.91	9.34	54.00	9.09	150	306	Vertical
2	2995.498	55.44	9.43	74.00	18.56	150	318	Vertical
3	4924.000	48.84	-18.87	74.00	25.16	150	94	Vertical
4	4924.000	44.52	-18.87	54.00	9.48	150	126	Vertical
5	7386.000	48.85	-10.72	74.00	25.15	150	180	Vertical
6	7386.000	36.14	-10.72	54.00	17.86	150	126	Vertical
7	17993.99	46.87	-0.40	54.00	7.13	150	166	Vertical

4.9.2.1.4 802.11B_Lowest Channel_ Horizontal



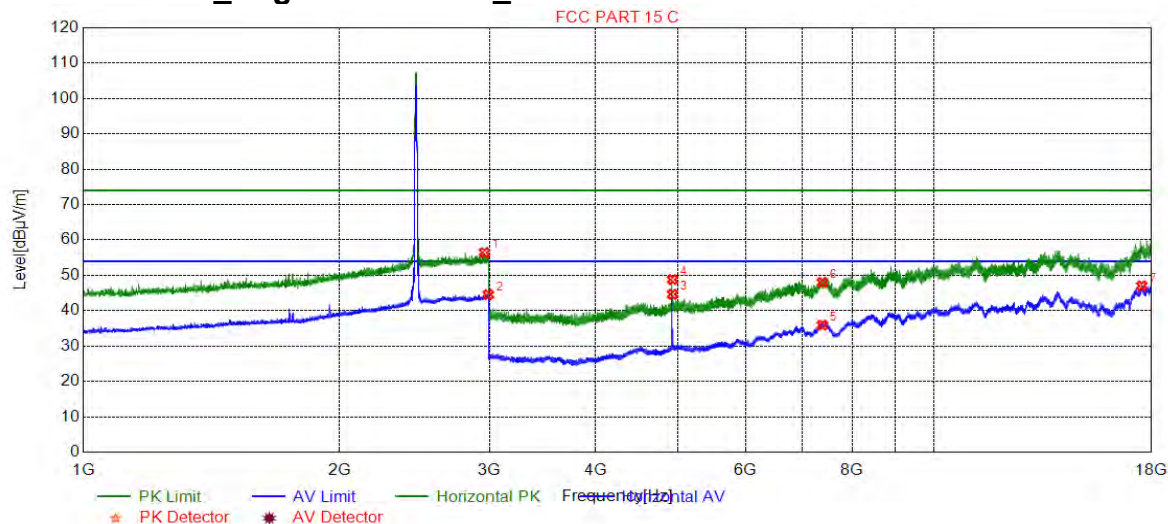
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2950.487	55.64	9.38	74.00	18.36	150	184	Horizontal
2	2953.488	44.46	9.38	54.00	9.54	150	37	Horizontal
3	4824.000	41.71	-20.09	54.00	12.29	150	126	Horizontal
4	4824.000	46.35	-20.09	74.00	27.65	150	99	Horizontal
5	7236.000	45.67	-12.40	74.00	28.33	150	315	Horizontal
6	7236.000	33.86	-12.40	54.00	20.14	150	261	Horizontal
7	17614.98	47.15	1.24	54.00	6.85	150	316	Horizontal

4.9.2.1.5 802.11B_ Middle Channel_ Horizontal



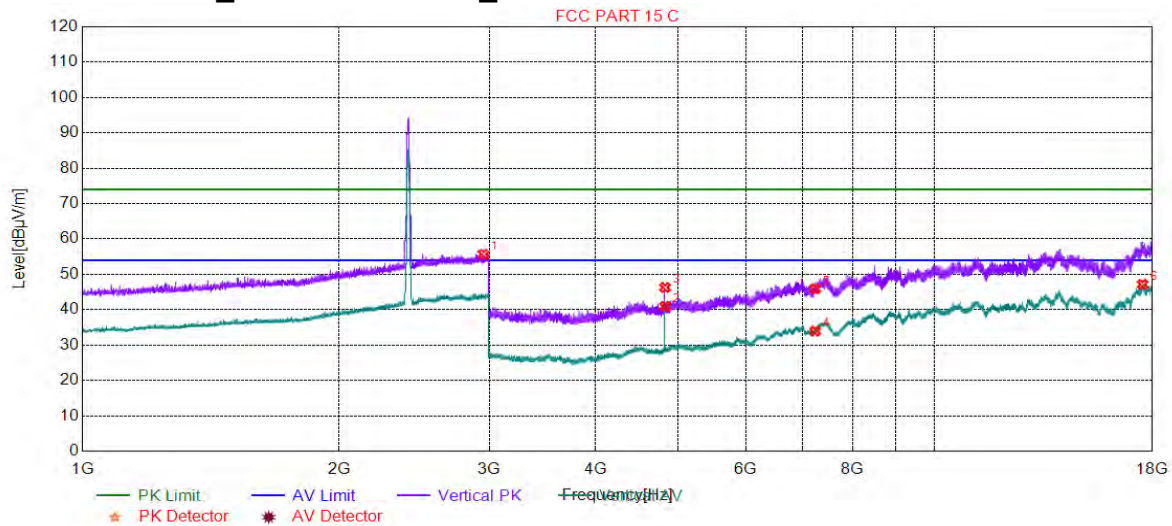
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2948.487	56.62	9.37	74.00	17.38	150	17	Horizontal
2	2976.994	44.90	9.41	54.00	9.10	150	66	Horizontal
3	4874.000	46.07	-19.37	74.00	27.93	150	100	Horizontal
4	4874.000	40.82	-19.37	54.00	13.18	150	127	Horizontal
5	7311.000	46.54	-11.50	74.00	27.46	150	287	Horizontal
6	7311.000	34.60	-11.50	54.00	19.40	150	46	Horizontal
7	17997.99	47.17	-0.37	54.00	6.83	150	166	Horizontal

4.9.2.1.6 802.11B_ Highest Channel_ Horizontal



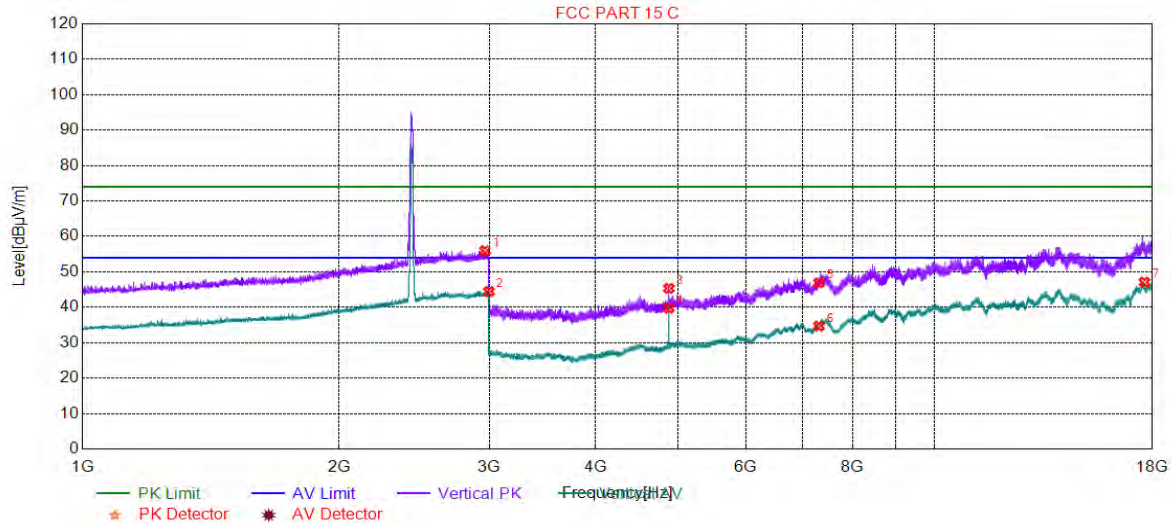
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2960.990	56.46	9.39	74.00	17.54	150	274	Horizontal
2	2990.997	44.56	9.43	54.00	9.44	150	200	Horizontal
3	4924.000	44.64	-18.87	54.00	9.36	150	100	Horizontal
4	4924.000	48.80	-18.87	74.00	25.20	150	100	Horizontal
5	7386.000	35.95	-10.72	54.00	18.05	150	261	Horizontal
6	7386.000	48.01	-10.72	74.00	25.99	150	127	Horizontal
7	17528.97	47.05	0.72	54.00	6.95	150	323	Horizontal

4.9.2.1.7 802.11G_Lowest Channel_Vertical



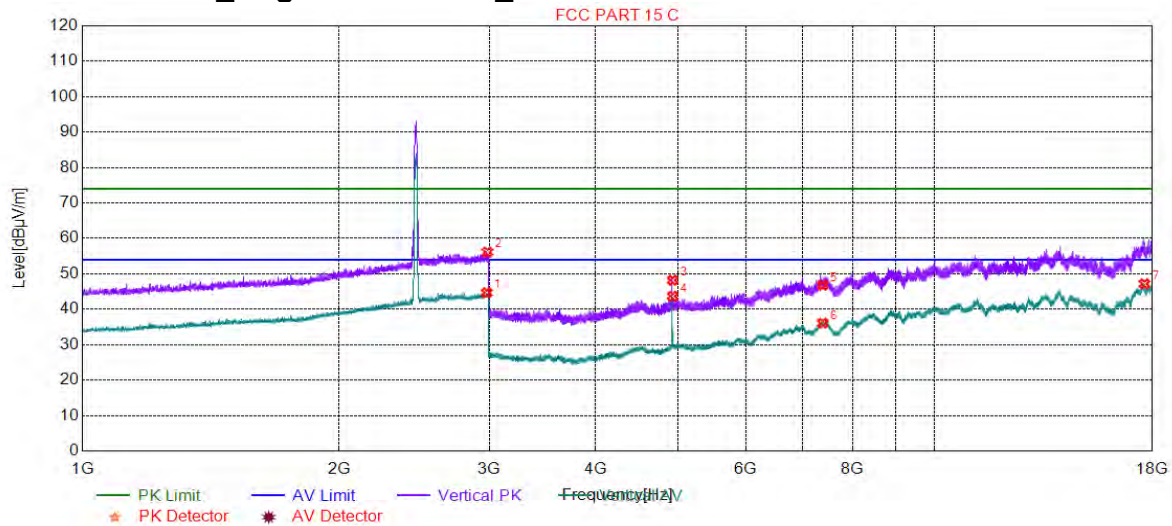
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2954.988	55.69	9.38	74.00	18.31	150	99	Vertical
2	4824.000	40.99	-20.09	54.00	13.01	150	124	Horizontal
3	4824.000	46.29	-20.09	74.00	27.71	150	126	Vertical
4	7236.000	33.96	-12.40	54.00	20.04	150	151	Horizontal
5	7236.000	45.93	-12.40	74.00	28.07	150	342	Vertical
6	17525.97	47.17	0.68	54.00	6.83	150	117	Horizontal

4.9.2.1.8 802.11G_ Middle Channel_ Vertical



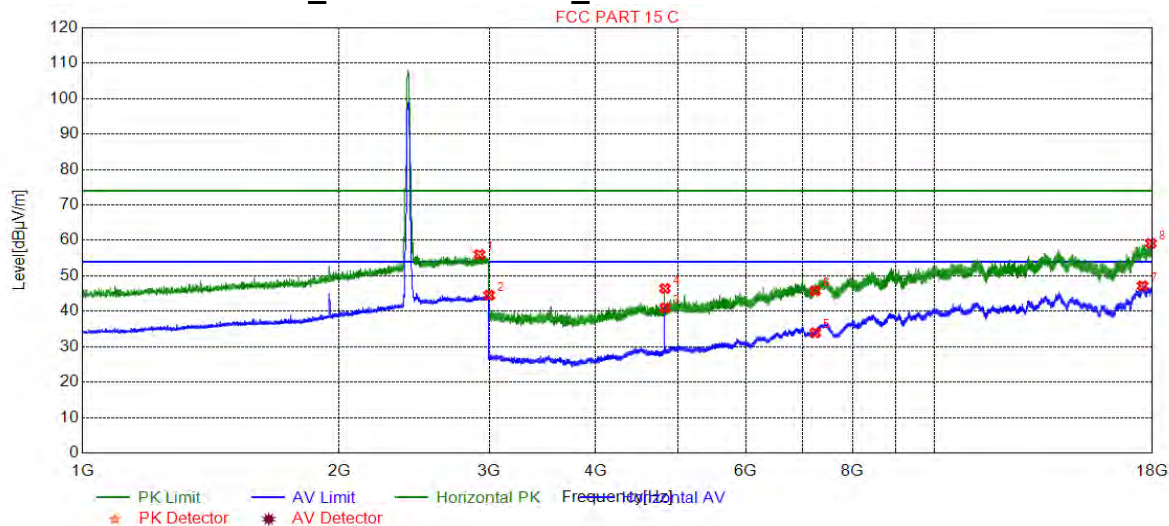
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2965.491	55.99	9.40	74.00	18.01	150	343	Vertical
2	2997.999	44.44	9.44	54.00	9.56	150	343	Vertical
3	4874.000	45.35	-19.37	74.00	28.65	150	72	Vertical
4	4874.000	39.73	-19.37	54.00	14.27	150	99	Vertical
5	7311.000	46.85	-11.50	74.00	27.15	150	234	Vertical
6	7311.000	34.70	-11.50	54.00	19.30	150	180	Vertical
7	17613.98	47.10	1.27	54.00	6.90	150	316	Vertical

4.9.2.1.9 802.11G_ Highest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2980.495	44.67	9.41	54.00	9.33	150	343	Vertical
2	2985.496	56.17	9.42	74.00	17.83	150	222	Vertical
3	4924.000	48.21	-18.87	74.00	25.79	150	99	Vertical
4	4924.000	43.70	-18.87	54.00	10.30	150	99	Vertical
5	7386.000	46.80	-10.72	74.00	27.20	150	126	Vertical
6	7386.000	36.07	-10.72	54.00	17.93	150	45	Vertical
7	17613.48	47.19	1.28	54.00	6.81	150	216	Vertical

4.9.2.1.10 802.11G_Lowest Channel_ Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2921.980	56.04	9.34	74.00	17.96	150	188	Horizontal
2	3000.000	44.53	9.44	54.00	9.47	150	298	Horizontal
3	4824.000	40.99	-20.09	54.00	13.01	150	124	Horizontal
4	4824.000	46.45	-20.09	74.00	27.55	150	124	Horizontal
5	7236.000	33.96	-12.40	54.00	20.04	150	151	Horizontal
6	7236.000	45.74	-12.40	74.00	28.26	150	204	Horizontal
7	17525.97	47.17	0.68	54.00	6.83	150	117	Horizontal
8	17923.49	59.16	-0.93	74.00	14.84	150	265	Horizontal



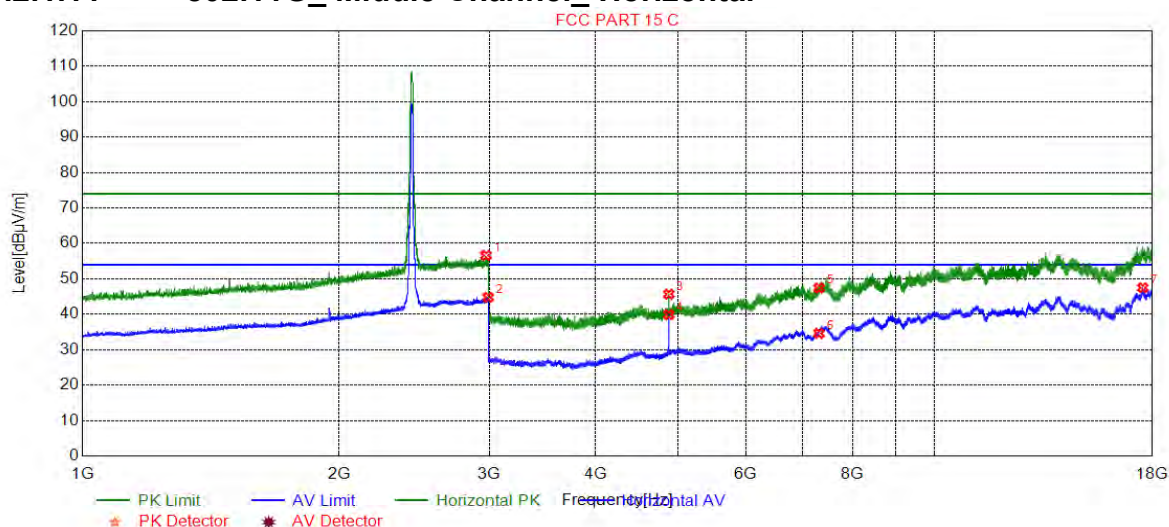
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4.9.2.1.11 802.11G_ Middle Channel_ Horizontal

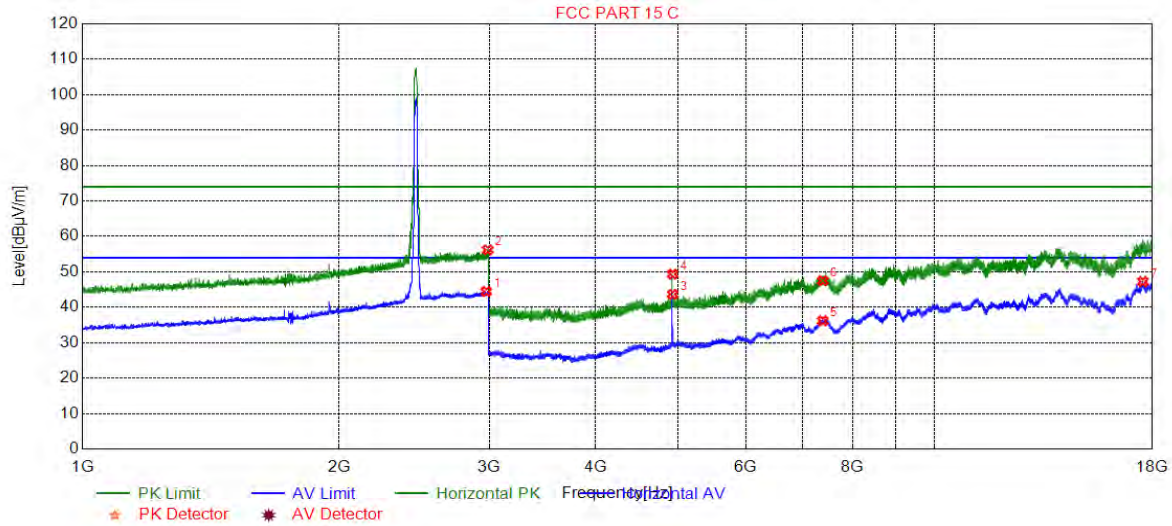


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2973.993	56.63	9.41	74.00	17.37	150	17	Horizontal
2	2991.497	44.77	9.43	54.00	9.23	150	285	Horizontal
3	4874.000	45.68	-19.37	74.00	28.32	150	99	Horizontal
4	4874.000	39.89	-19.37	54.00	14.11	150	127	Horizontal
5	7311.000	47.42	-11.50	74.00	26.58	150	45	Horizontal
6	7311.000	34.61	-11.50	54.00	19.39	150	45	Horizontal
7	17534.97	47.50	0.80	54.00	6.50	150	266	Horizontal

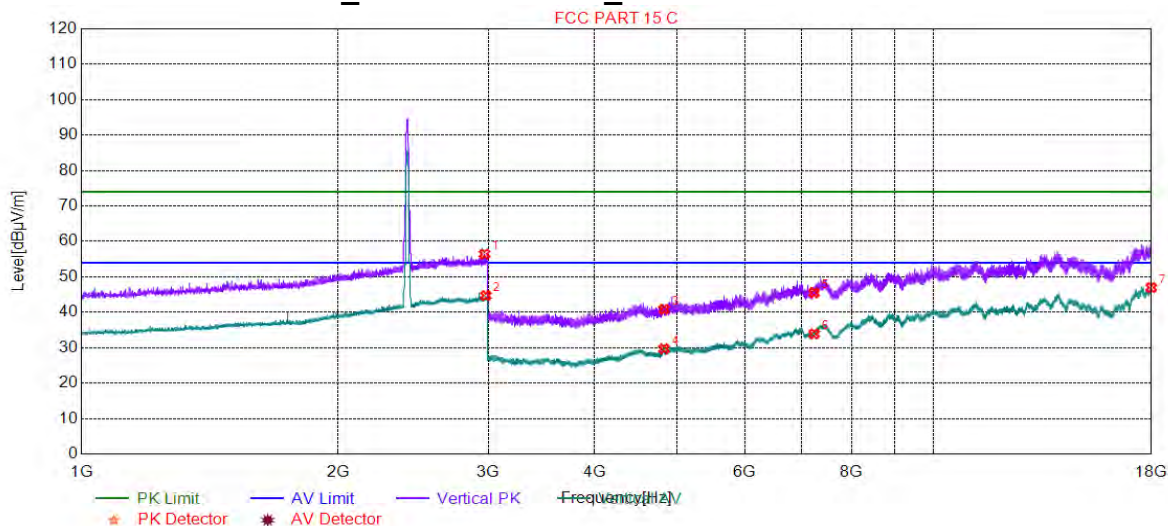


4.9.2.1.12 802.11G_ Highest Channel_ Horizontal



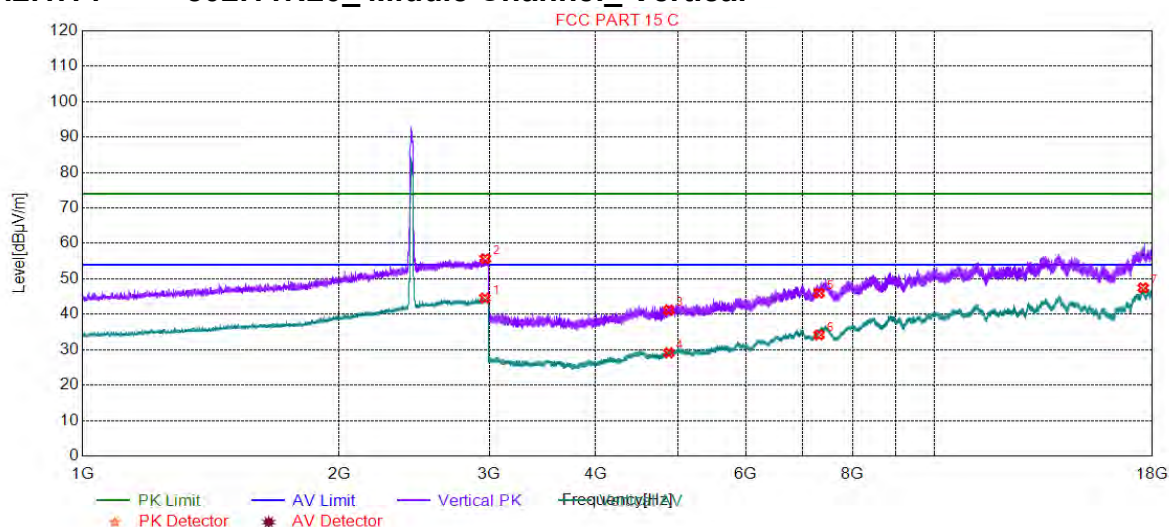
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2976.494	44.46	9.41	54.00	9.54	150	29	Horizontal
2	2987.997	56.21	9.42	74.00	17.79	150	139	Horizontal
3	4924.000	43.66	-18.87	54.00	10.34	150	96	Horizontal
4	4924.000	49.34	-18.87	74.00	24.66	150	96	Horizontal
5	7386.000	36.18	-10.72	54.00	17.82	150	231	Horizontal
6	7386.000	47.49	-10.72	74.00	26.51	150	42	Horizontal
7	17535.97	47.25	0.81	54.00	6.75	150	315	Horizontal

4.9.2.1.13 802.11N20_Lowest Channel_Vertical



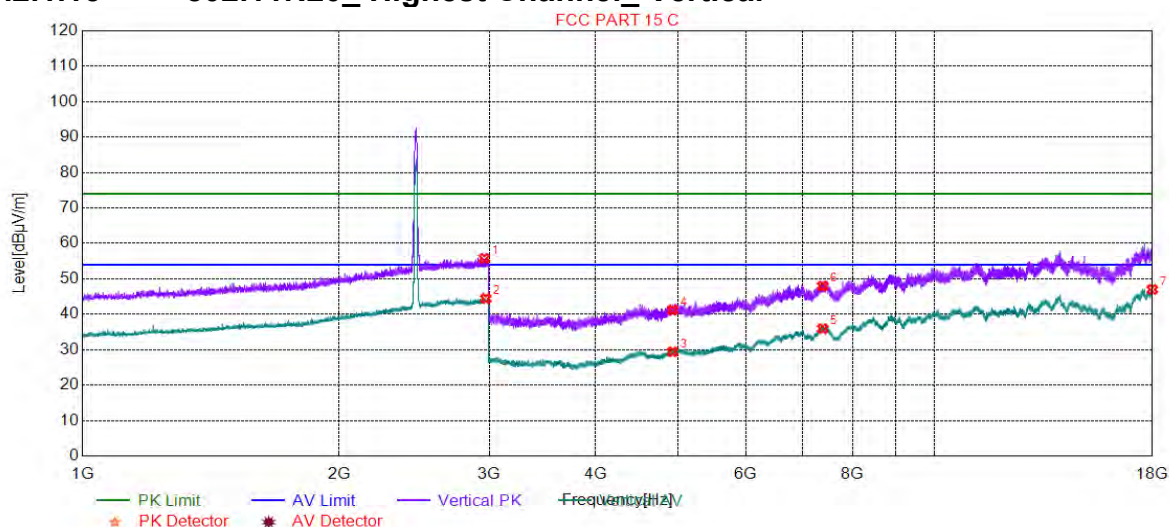
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2970.492	56.46	9.40	74.00	17.54	150	184	Vertical
2	2980.495	44.70	9.41	54.00	9.30	150	343	Vertical
3	4824.000	40.85	-20.09	74.00	33.15	150	127	Vertical
4	4824.000	29.70	-20.09	54.00	24.30	150	153	Vertical
5	7236.000	45.52	-12.40	74.00	28.48	150	342	Vertical
6	7236.000	33.92	-12.40	54.00	20.08	150	315	Vertical
7	17989.49	46.96	-0.43	54.00	7.04	150	167	Vertical

4.9.2.1.14 802.11N20_Middle Channel_Vertical



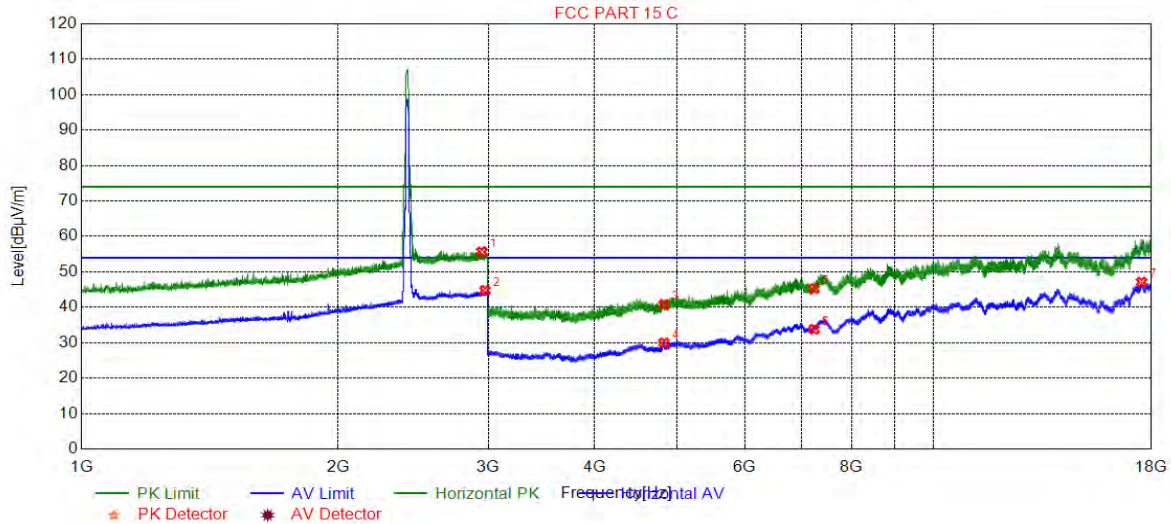
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2965.491	44.58	9.40	54.00	9.42	150	318	Vertical
2	2968.492	55.69	9.40	74.00	18.31	150	134	Vertical
3	4874.000	41.19	-19.37	74.00	32.81	150	127	Vertical
4	4874.000	29.12	-19.37	54.00	24.88	150	154	Vertical
5	7311.000	45.97	-11.50	74.00	28.03	150	100	Vertical
6	7311.000	34.18	-11.50	54.00	19.82	150	100	Vertical
7	17549.97	47.46	0.99	54.00	6.54	150	68	Vertical

4.9.2.1.15 802.11N20_ Highest Channel_ Vertical



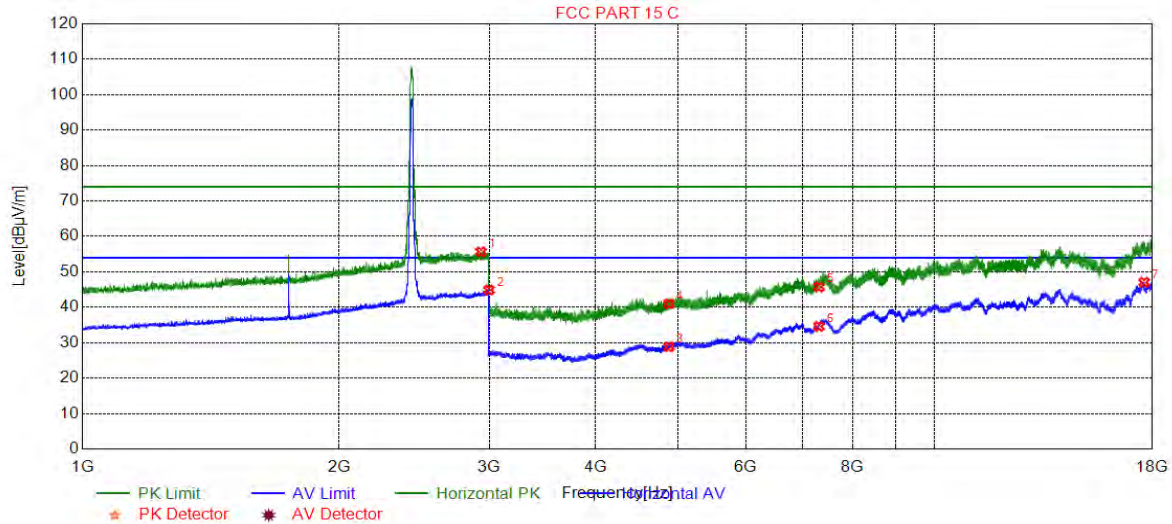
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2959.990	55.82	9.39	74.00	18.18	150	87	Vertical
2	2972.493	44.44	9.40	54.00	9.56	150	148	Vertical
3	4924.000	29.41	-18.87	54.00	24.59	150	314	Vertical
4	4924.000	41.19	-18.87	74.00	32.81	150	126	Vertical
5	7386.000	35.94	-10.72	54.00	18.06	150	18	Vertical
6	7386.000	47.96	-10.72	74.00	26.04	150	99	Vertical
7	17991.99	47.02	-0.41	54.00	6.98	150	166	Vertical

4.9.2.1.16 802.11N20_Lowest Channel_Horizontal



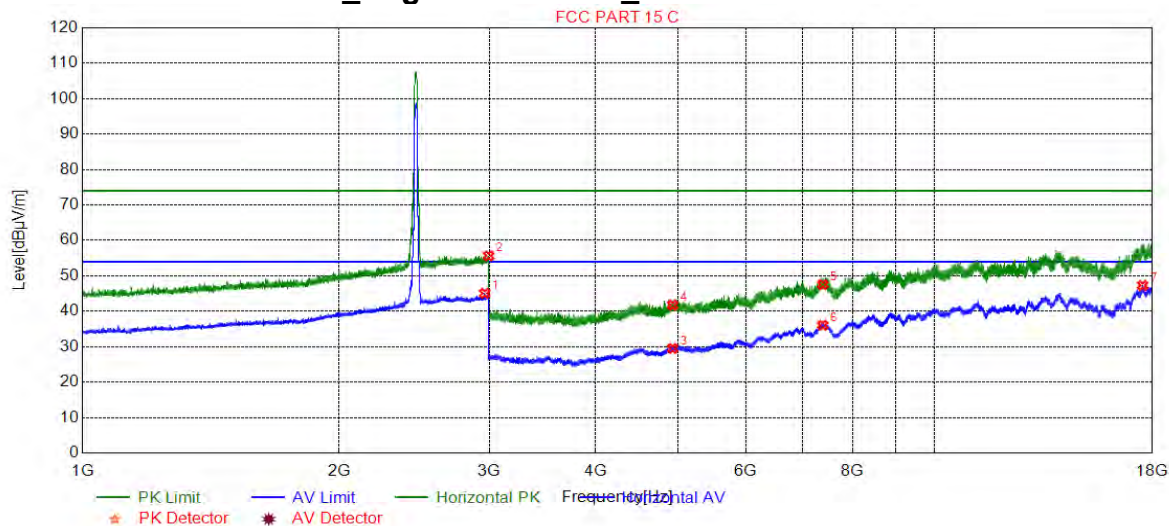
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2948.487	55.64	9.37	74.00	18.36	150	30	Horizontal
2	2974.993	44.76	9.41	54.00	9.24	150	176	Horizontal
3	4824.000	40.81	-20.09	74.00	33.19	150	127	Horizontal
4	4824.000	29.96	-20.09	54.00	24.04	150	127	Horizontal
5	7236.000	45.25	-12.40	74.00	28.75	150	0	Horizontal
6	7236.000	33.79	-12.40	54.00	20.21	150	154	Horizontal
7	17524.97	47.11	0.67	54.00	6.89	150	18	Horizontal

4.9.2.1.17 802.11N20_ Middle Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2933.483	55.66	9.35	74.00	18.34	150	67	Horizontal
2	2998.499	44.87	9.44	54.00	9.13	150	288	Horizontal
3	4874.000	28.85	-19.37	54.00	25.15	150	154	Horizontal
4	4874.000	40.99	-19.37	74.00	33.01	150	261	Horizontal
5	7311.000	45.72	-11.50	74.00	28.28	150	154	Horizontal
6	7311.000	34.59	-11.50	54.00	19.41	150	46	Horizontal
7	17596.97	47.06	1.59	54.00	6.94	150	216	Horizontal

4.9.2.1.18 802.11N20_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2964.491	45.06	9.39	54.00	8.94	150	17	Horizontal
2	2995.999	55.63	9.43	74.00	18.37	150	262	Horizontal
3	4924.000	29.51	-18.87	54.00	24.49	150	150	Horizontal
4	4924.000	41.74	-18.87	74.00	32.26	150	150	Horizontal
5	7386.000	47.56	-10.72	74.00	26.44	150	150	Horizontal
6	7386.000	36.05	-10.72	54.00	17.95	150	230	Horizontal
7	17526.97	47.27	0.70	54.00	6.73	150	237	Horizontal

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

4) All Modes have been tested, but only the worst case data displayed in this report.



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4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10: 2013 Section 11.12		
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m @3m)	Remark
	30MHz-88MHz	40.0	Quasi-peak Value
	88MHz-216MHz	43.5	Quasi-peak Value
	216MHz-960MHz	46.0	Quasi-peak Value
	960MHz-1GHz	54.0	Quasi-peak Value
	Above 1GHz	54.0	Average Value
		74.0	Peak Value
Test Setup:			

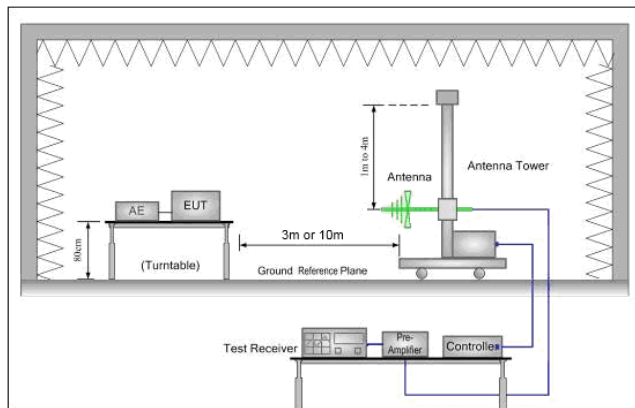


Figure 1. 30MHz to 1GHz

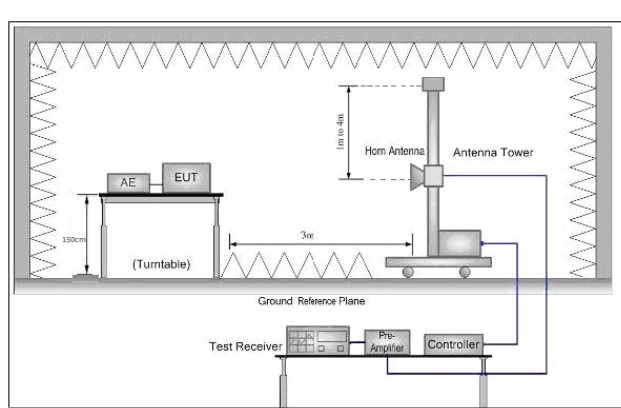


Figure 2. Above 1 GHz



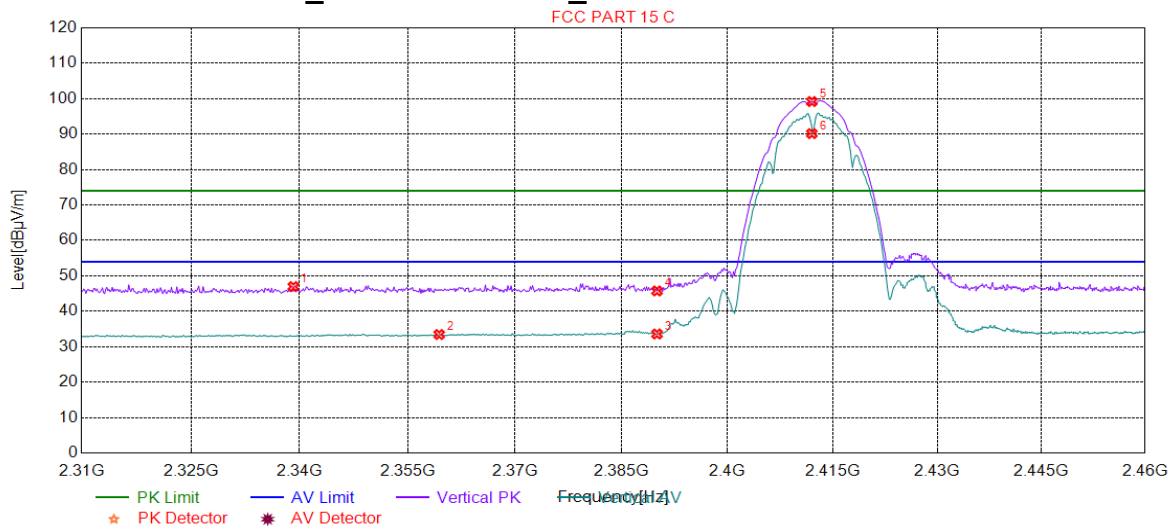
Test Procedure:	a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel h. Test the EUT in the lowest channel , the Highest channel i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case. j. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.
Final Test Mode:	Pretest the EUT at Charge +Transmitting mode. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



Test plot as follows:

4.10.1 ANT1

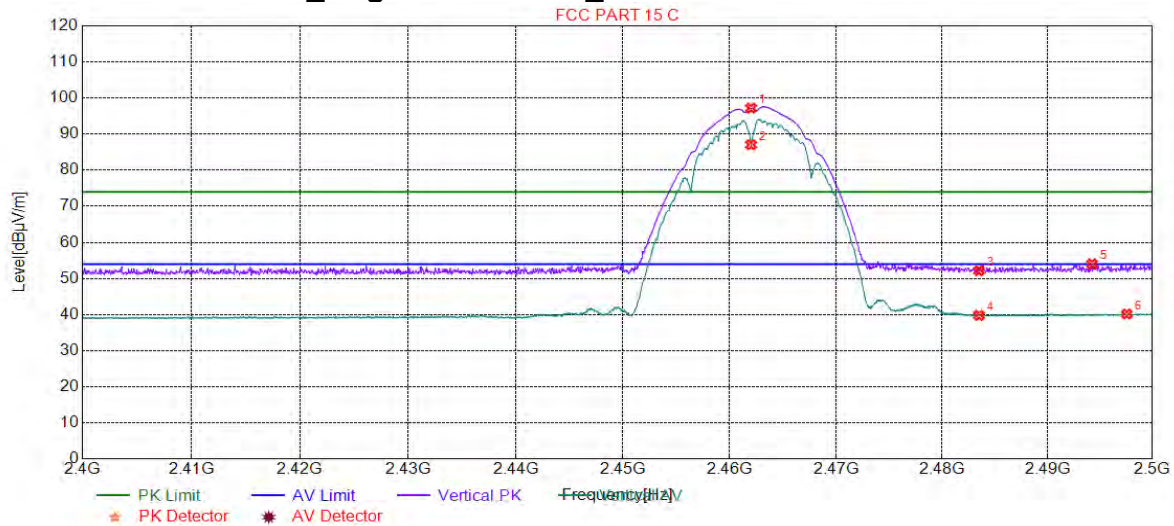
4.10.1.1 802.11B_Lowest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2339.129	46.98	7.49	74.00	27.02	150	336	Vertical
2	2359.399	33.44	7.55	54.00	20.56	150	166	Vertical
3	2390.000	33.60	7.64	54.00	20.40	150	336	Vertical
4	2390.000	45.74	7.64	74.00	28.26	150	12	Vertical
5	2412.000	99.20	7.74	74.00	-25.20	150	336	Vertical
6	2412.000	90.15	7.74	54.00	-36.15	150	336	Vertical



4.10.1.2 802.11B_ Highest Channel_ Vertical



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	97.19	8.01	74.00	-23.19	150	341	Vertical
2	2462.000	87.05	8.01	54.00	-33.05	150	346	Vertical
3	2483.500	52.16	8.13	74.00	21.84	150	233	Vertical
4	2483.500	39.76	8.13	54.00	14.24	150	190	Vertical
5	2494.247	54.04	8.19	74.00	19.96	150	346	Vertical
6	2497.548	40.15	8.21	54.00	13.85	150	48	Vertical

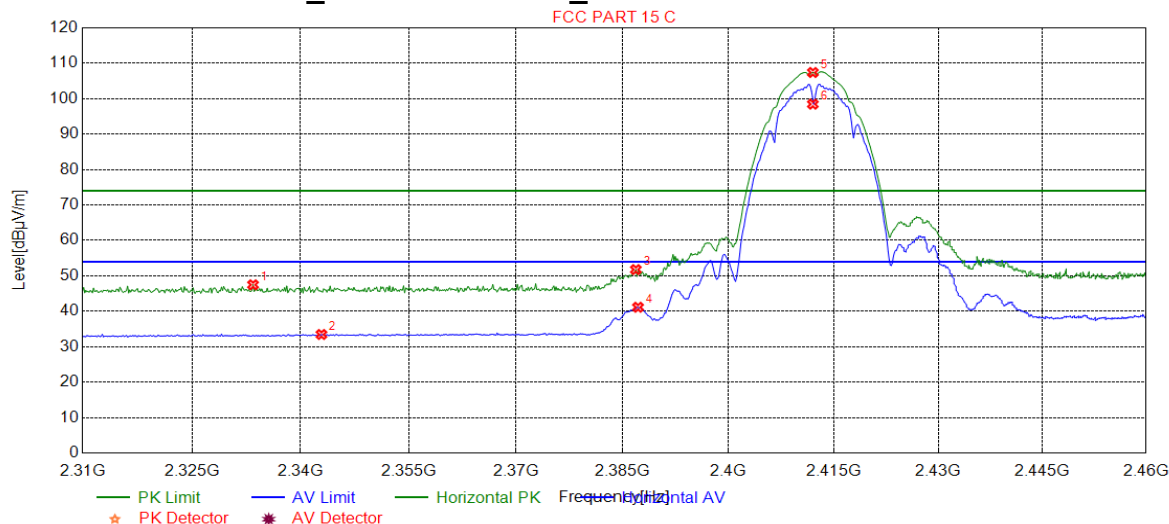


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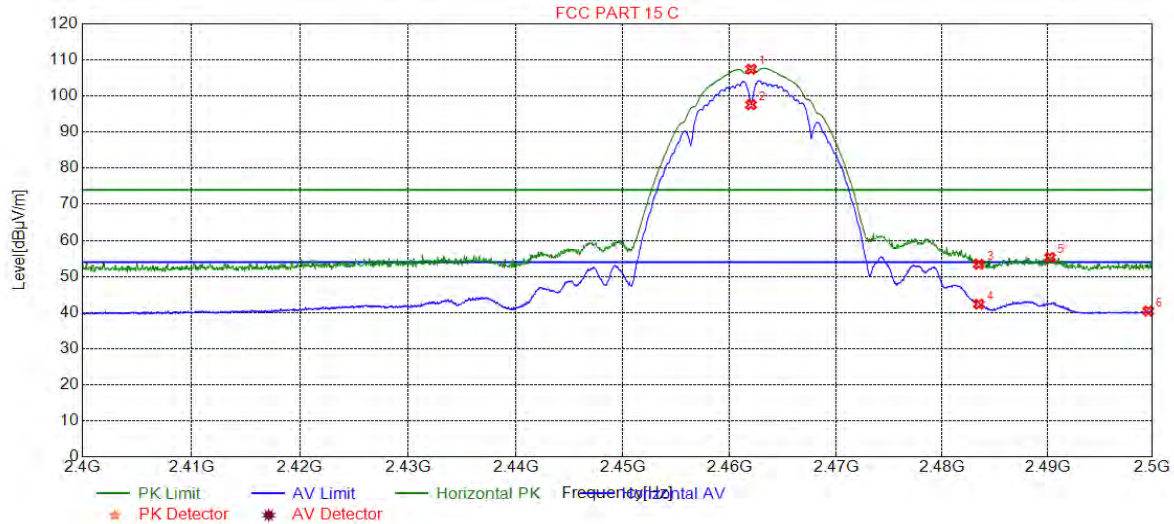
4.10.1.3 802.11B_Lowest Channel_ Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2333.423	47.48	7.47	74.00	26.52	150	104	Horizontal
2	2342.882	33.46	7.50	54.00	20.54	150	83	Horizontal
3	2386.876	51.77	7.63	74.00	22.23	150	83	Horizontal
4	2387.177	41.14	7.63	54.00	12.86	150	83	Horizontal
5	2412.000	107.40	7.74	74.00	-33.40	150	83	Horizontal
6	2412.000	98.45	7.74	54.00	-44.45	150	104	Horizontal

4.10.1.4 802.11B_ Highest Channel_ Horizontal

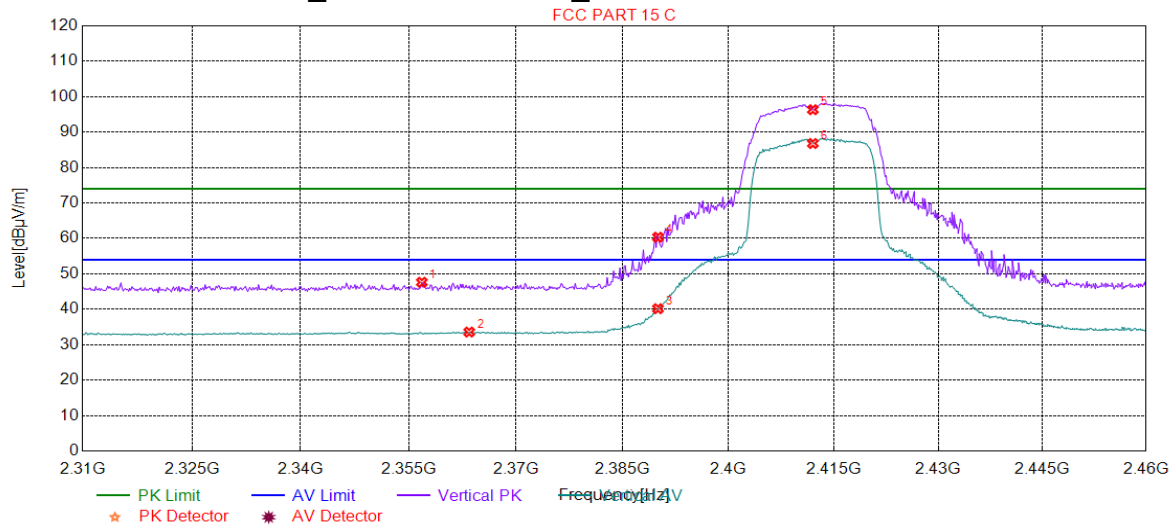


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	107.41	8.01	74.00	-33.41	150	80	Horizontal
2	2462.000	97.58	8.01	54.00	-43.58	150	74	Horizontal
3	2483.500	53.39	8.13	74.00	20.61	150	95	Horizontal
4	2483.500	42.32	8.13	54.00	11.68	150	85	Horizontal
5	2490.245	55.29	8.17	74.00	18.71	150	90	Horizontal
6	2499.599	40.41	8.22	54.00	13.59	150	90	Horizontal



4.10.1.5 802.11G_Lowest Channel_Vertical

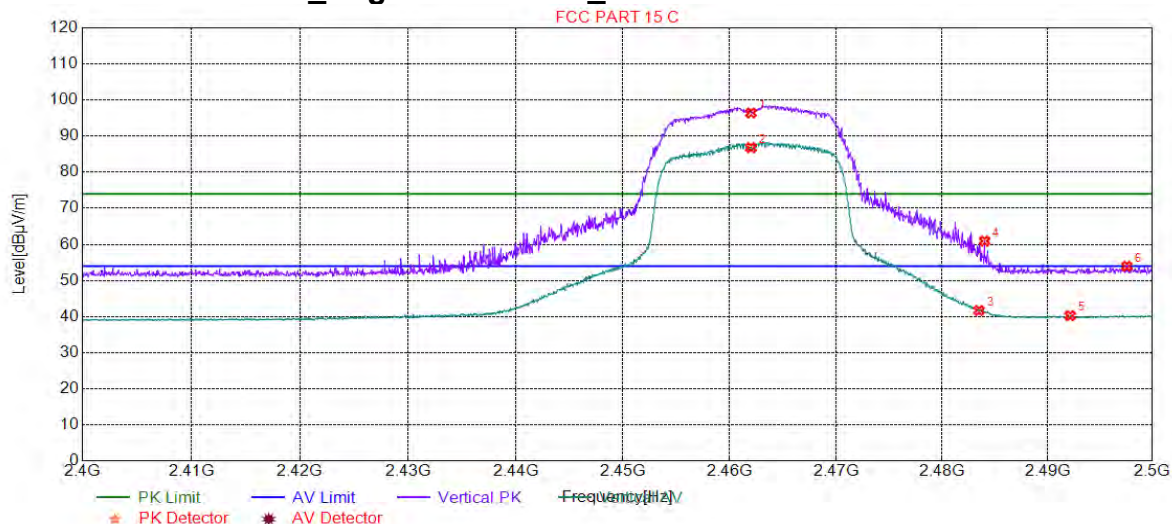


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2356.846	47.63	7.54	74.00	26.37	150	64	Vertical
2	2363.453	33.58	7.56	54.00	20.42	150	208	Vertical
3	2390.000	40.17	7.64	54.00	13.83	150	342	Vertical
4	2390.000	60.35	7.64	74.00	13.65	150	342	Vertical
5	2412.000	96.33	7.74	74.00	-22.33	150	329	Vertical
6	2412.000	86.79	7.74	54.00	-32.79	150	329	Vertical



4.10.1.6 802.11G_ Highest Channel_ Vertical



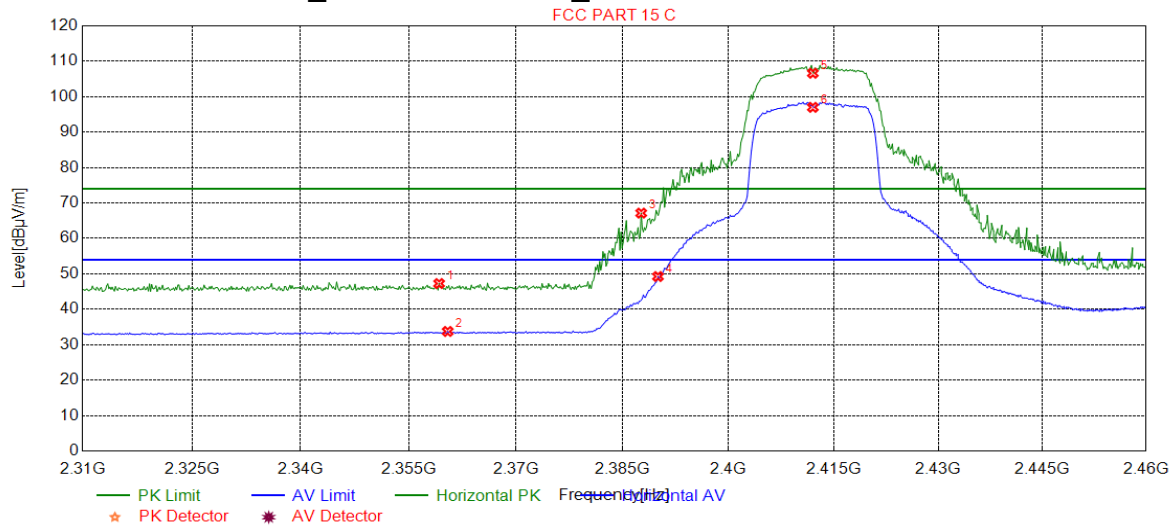
Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	96.42	8.01	74.00	-22.42	150	340	Vertical
2	2462.000	86.80	8.01	54.00	-32.80	150	340	Vertical
3	2483.500	41.67	8.13	54.00	12.33	150	340	Vertical
4	2484.042	60.92	8.13	74.00	13.08	150	340	Vertical
5	2492.146	40.25	8.18	54.00	13.75	150	272	Vertical
6	2497.548	53.98	8.21	74.00	20.02	150	60	Vertical





4.10.1.7 802.11G_Lowest Channel_ Horizontal



Suspected List

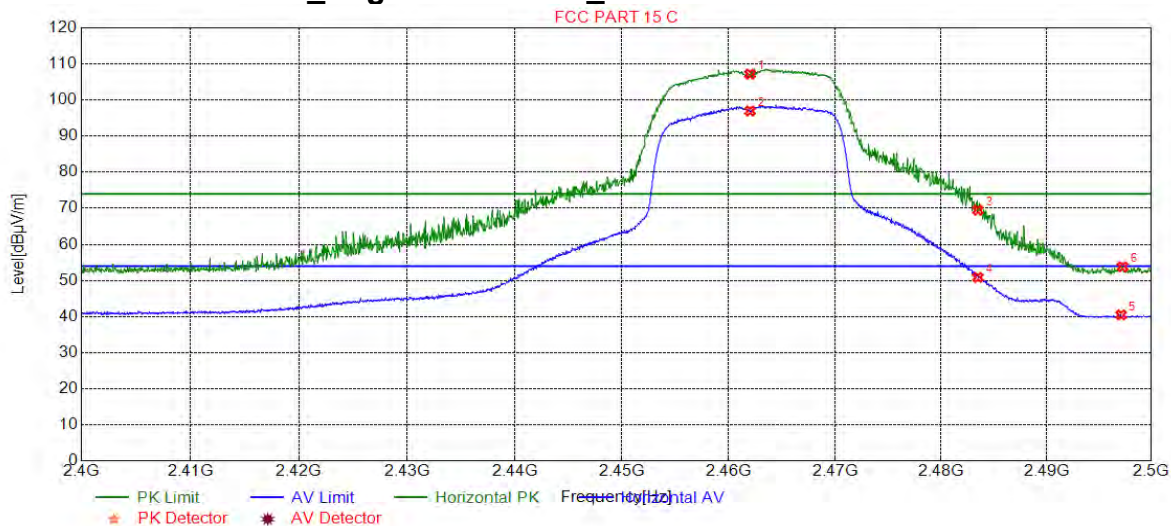
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2359.249	47.27	7.55	74.00	26.73	150	234	Horizontal
2	2360.450	33.75	7.55	54.00	20.25	150	15	Horizontal
3	2387.627	67.14	7.63	74.00	6.86	150	76	Horizontal
4	2390.000	49.25	7.64	54.00	4.75	150	80	Horizontal
5	2412.000	106.62	7.74	74.00	-32.62	150	80	Horizontal
6	2412.000	97.00	7.74	54.00	-43.00	150	76	Horizontal



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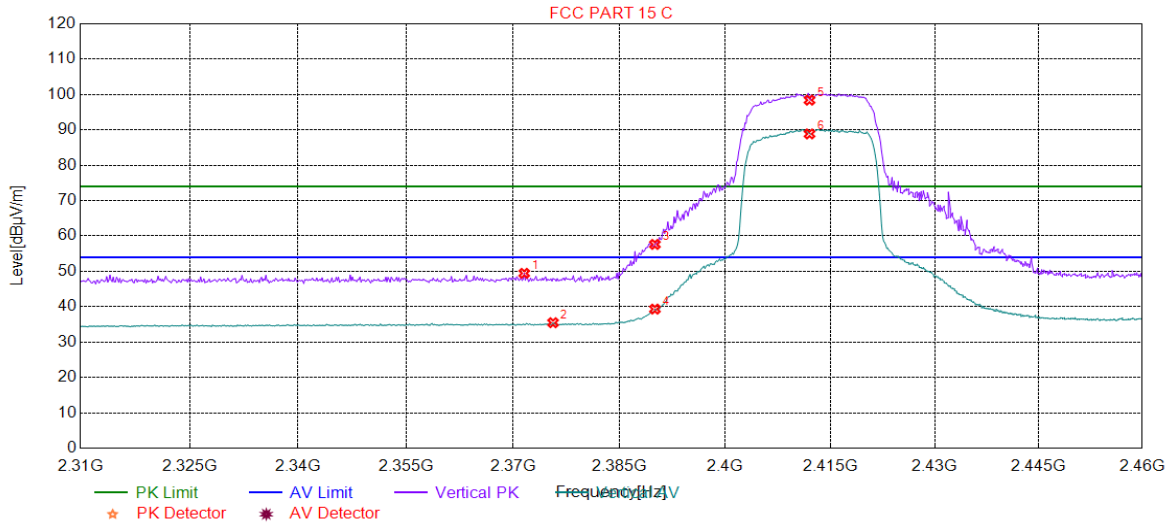
4.10.1.8 802.11G_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	107.18	8.01	74.00	-33.18	150	76	Horizontal
2	2462.000	96.96	8.01	54.00	-42.96	150	76	Horizontal
3	2483.500	69.49	8.13	74.00	4.51	150	82	Horizontal
4	2483.500	50.84	8.13	54.00	3.16	150	76	Horizontal
5	2497.098	40.47	8.20	54.00	13.53	150	184	Horizontal
6	2497.248	53.80	8.20	74.00	20.20	150	170	Horizontal



4.10.1.9 802.11N20_Lowest Channel_Vertical



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2371.561	49.45	9.14	74.00	24.55	150	179	Vertical
2	2375.615	35.48	9.15	54.00	18.52	150	250	Vertical
3	2390.000	57.62	9.20	74.00	16.38	150	241	Vertical
4	2390.000	39.33	9.20	54.00	14.67	150	250	Vertical
5	2412.000	98.41	9.27	74.00	-24.41	150	88	Vertical
6	2412.000	88.86	9.27	54.00	-34.86	150	246	Vertical

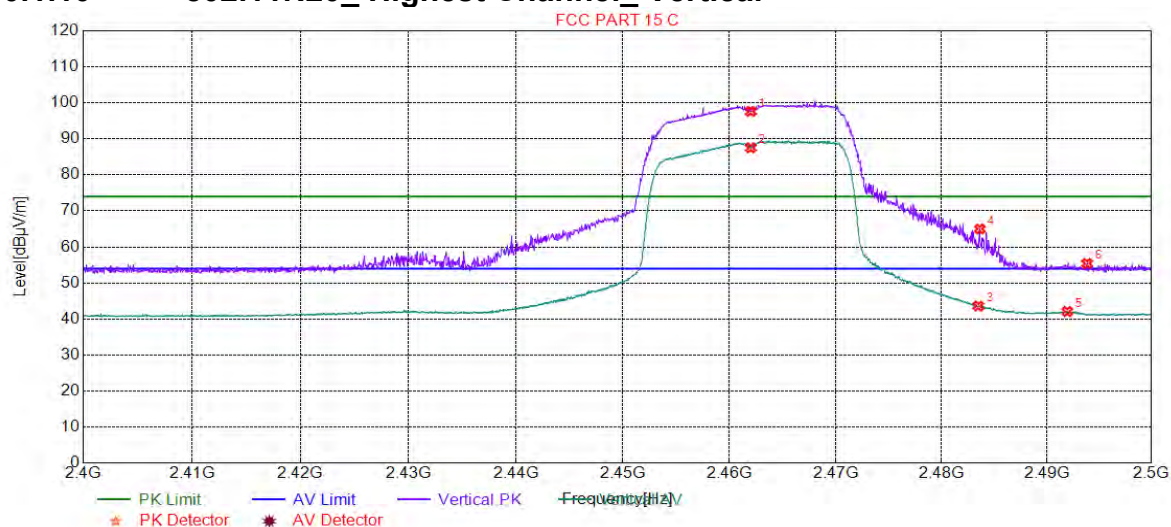


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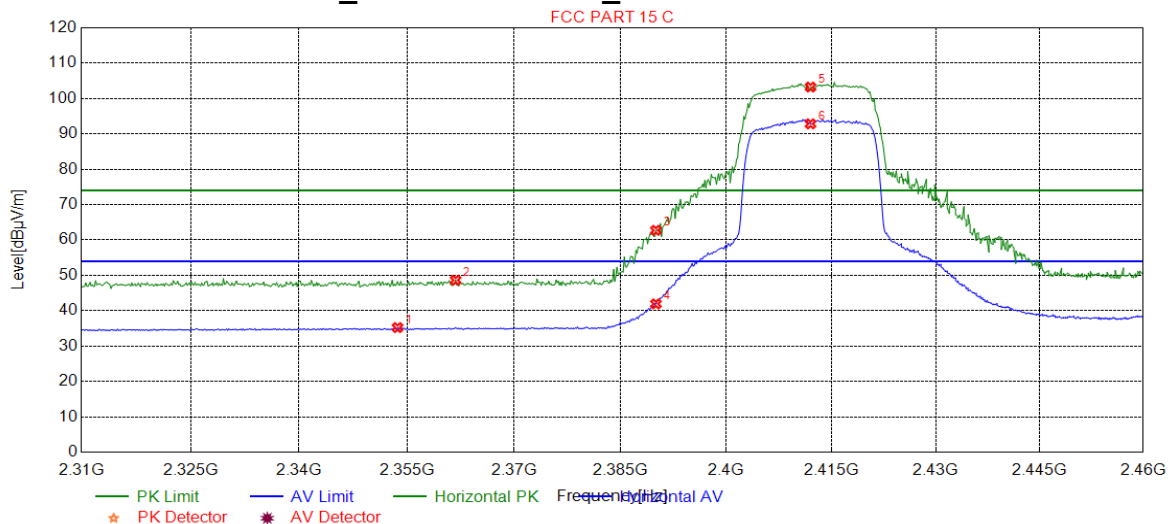
4.10.1.10 802.11N20_ Highest Channel_ Vertical



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	97.61	9.43	74.00	-23.61	150	78	Vertical
2	2462.000	87.51	9.43	54.00	-33.51	150	244	Vertical
3	2483.500	43.59	9.50	54.00	10.41	150	288	Vertical
4	2483.641	64.99	9.50	74.00	9.01	150	73	Vertical
5	2491.946	42.08	9.52	54.00	11.92	150	293	Vertical
6	2493.846	55.41	9.53	74.00	18.59	150	299	Vertical

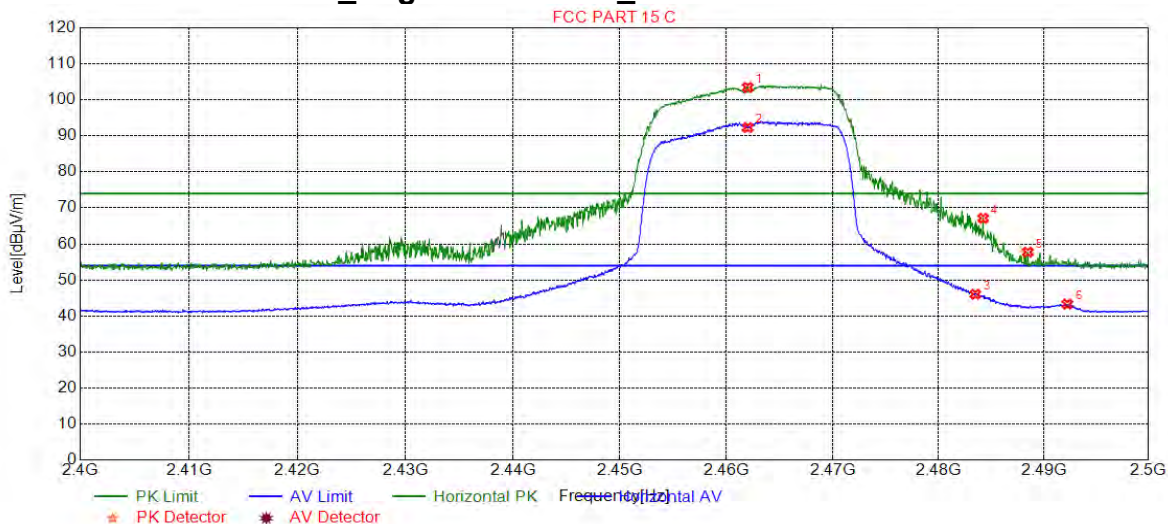
4.10.1.11 802.11N20_Lowest Channel_Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2353.693	35.24	9.08	54.00	18.76	150	78	Horizontal
2	2361.801	48.65	9.10	74.00	25.35	150	278	Horizontal
3	2390.000	62.74	9.20	74.00	11.26	150	311	Horizontal
4	2390.000	41.94	9.20	54.00	12.06	150	257	Horizontal
5	2412.000	103.24	9.27	74.00	-29.24	150	253	Horizontal
6	2412.000	92.84	9.27	54.00	-38.84	150	253	Horizontal

4.10.1.12 802.11N20_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	103.46	9.43	74.00	-29.46	150	253	Horizontal
2	2462.000	92.29	9.43	54.00	-38.29	150	253	Horizontal
3	2483.500	46.04	9.50	54.00	7.96	150	253	Horizontal
4	2484.242	67.12	9.50	74.00	6.88	150	253	Horizontal
5	2488.494	57.72	9.51	74.00	16.28	150	263	Horizontal
6	2492.246	43.29	9.53	54.00	10.71	150	253	Horizontal

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

All Modes have been tested, but only the worst case data displayed in this report.



5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.75dB
2	RF power density, conducted	±2.84dB
3	Spurious emissions, conducted	±0.75dB
4	Radiated Spurious emission test	±4.5dB (30MHz-1GHz)
		±4.8dB (1GHz-25GHz)
5	Conduct emission test	±3.12 dB (9KHz- 30MHz)
6	Temperature test	±1°C
7	Humidity test	±3%
8	DC and low frequency voltages	±0.5%



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6 Equipment List

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017/5/10	2020/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2019/7/14	2020/7/14
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2019/4/1	2020/3/31
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2019/6/12	2020/6/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2019/2/11	2020/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2019/3/2	2020/3/1
RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
DC Power Supply	Agilent Technologies Inc	66311B	W009-09	2019/7/15	2020/7/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2019/1/13	2020/1/12
Coaxial Cable	SGS	N/A	SEM031-01	2019/6/12	2020/6/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019/7/14	2020/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2018/11/27	2019/11/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019/7/14	2020/7/14
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017/8/5	2020/8/4
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019/6/12	2020/6/11
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2019/7/14	2020/7/14
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017/6/27	2020/6/26
Pre-amplifier (0.1-1.3GHz)	Agilent Technologies	8447D	SEM005-01	2019/3/2	2020/3/1
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018/3/13	2021/3/12
Measurement Software	AUDIX	e3V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2019/6/12	2020/6/11
EXA Signal Analyzer (10Hz-26.5GHz)	Agilent Technologies Inc	N9010A	SEM004-09	2019/3/12	2020/3/11
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017/6/27	2020/6/26
Horn Antenna (0.8-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/4/13	2021/4/12
Pre-amplifier(0.1-1.3GHz)	HP	8447D	SEM005-02	2019/7/14	2020/7/14
Low Noise Amplifier(100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2019/9/3	2020/9/2
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017/10/17	2020/10/16
Pre-amplifier(18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2019/3/2	2020/3/1
Band filter	N/A	N/A	SEM023-01	N/A	N/A





RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018/3/31	2021/3/30
EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2019/3/2	2020/3/1
Trilog-Broadband Antenna(25M-2GHz)	Schwarzbeck	VULB9168	SEM003-18	2018/3/15	2020/3/14
Pre-amplifier (9k-1GHz)	Sonoma	310N	SEM005-03	2019/3/12	2020/3/11
Loop Antenna (9kHz-30MHz)	ETS-Lindgren	6502	SEM003-08	2017/8/22	2020/8/21
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2019/6/12	2020/6/11

7 Photographs - EUT Constructional Details

Please refer to external and internal photos for details.

The End



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Shenzhen Branch Inspection & Testing Services Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com